Relationships Between County-Wide Measures of Certain Socio-Economic Factors, Intelligence, And Academic Achievement of High School Seniors in Florida

By
SAMUEL SANDY BOTTOSTO

A DISSERTATION PRESENTED TO THE GRADUATE COUNCIL OF
THE UNIVERSITY OF FLORIDA
IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE
DEGREE OF DOCTOR OF EDUCATION

UNIVERSITY OF FLORIDA
June, 1959

ACKNOWLEDGMENTS

The writer desires to acknowledge his profound indebtedness to the chairman of his supervisory committee, Dr. Joseph M. Leps, whose patience, interest, and perspicacity aided greatly in the completion of this dissertation.

To the other members of his committee the writer is also indebted: To Dr. R. L. Johns, for his numerous suggestions and constructive criticism which strengthened the study; to Doctors Douglas Scates, Vynce Hines, and Ernest Lytle, for their specific help in directing the statistical phase of the study; and to Doctors Robert Myers and George Bentley, for their encouragement and assistance throughout the study.

Dr. W. D. Spears deserves special mention for his significant contributions at various stages of the study. Special thanks are due the Statistical Laboratory at the University of Florida and the Director, Dr. H. A. Meyer, for making available its facilities at a nominal fee. Particular thanks are due Dr. Ernest Lytle, a member of the Statistical Laboratory Staff, who served on the writer's committee and provided indispensable aid and technical advice concerning the International Business Machines which were used for most of the computations in this study.

Sincere thanks are also due Dr. John V. McQuitty, University Examiner, for permitting the use of official records, for his personal

assistance in locating pertinent data, and for his aid in interpreting various phases of the Florida State-Wide Twelfth-Grade Testing Program.

To all others who have contributed in any way, the writer is indeed grateful. However, it is fitting and proper that the greatest indebtedness of all should be acknowledged: the writer's indebtedness to his wife, Margaret, for her loyalty, encouragement, empathy, and extensive assistance in the preparation of this manuscript.

TABLE OF CONTENTS

TABLE OF CONTENTS--Continued

TABLE OF CONTENTS--Continued

Chapter Page

Chapter Page

LIST OF TABLES

LIST OF TABLES--Continued

LIST OF FIGURES

CHAPTER I

INTRODUCTION

Constant concern for the quality of education characterizes a democratic way of life. In America this serious concern, coupled with a remarkable faith in the freedom of the individual as basic to the general welfare, has ushered into existence one of the greatest cultural experiments ever to be undertaken by the human race: the fostering in a free society of the widest and fullest development of its human resources by making available universal educational opportunities through the twelfth grade. Although great strides toward the maximum development of its human resources have been taken in the United States, the American ideal of equal opportunity for education has not been realized. More and more Americans are voicing the complaint that a large number of children are not receiving the education to which their avowed right to full development entitles them (7, 10). Evidence has been accumulating in recent years on the subject of differences in American educational opportunity and attainment. A considerable volume of data has been gathered on differences in educational opportunities between states, regions, urban-rural communities, and social classes (1).

While it may be gratifying to trace historically the ever-increasing breadth and depth of free public education in America, it is well to acknowledge the existence of many current educational

shortcomings, particularly those inequalities in schooling afforded children of different family and community economic levels. In a county-by-county comparison of the levels of living on a national basis, Edwards (6) found that in most instances those counties with the lowest levels of living were the ones with the heaviest educational load. As a result of this study, Edwards recommended that Federal and state aid be given directly to individual pupils and students whose needs and capabilities justified it. If this were not done, Edwards saw little hope of achieving the American ideal of equal educational opportunity (6).

The constant concern for the quality of education in a democracy serves to highlight the interrelatedness of education and the environment of which it is a part. It is difficult to understand adequately the schools of any nation, region, state, or community without some insight into the social and economic forces which foster and give sustenance to education (13, p. 3). As Joseph K. Hart has pointed out:

> ...the democratic problem in education is not primarily one of training children; it is the problem of making a community in which children can not help growing up to be democratic, intelligent, disciplined, reverent of the goods of life and eager to share in the task of the age. A school cannot produce this result; nothing but a community can do so; consequently, we can never be satisfied that we have met the educational problems of our day when we have good schools. We must have good communities (9, p. 383).

Background of the Study

The observational units in this group study are ecological in nature, involving the sixty-seven counties of Florida. Since the school district boundaries are coterminous with the boundaries of the major unit of civil government in Florida, it is important to note the general psychological atmosphere of wholesome and aggressive public support of education prevailing throughout the state at the present time. Evidence of a pervasively favorable educational climate was strikingly revealed by the unprecedented action taken by the regular session of the 1957 Florida Legislature. Positive steps were taken by the Legislature to improve, expand, and strengthen the state's basic program for public education. Not only were certain adjustments made in the critical area of teachers salaries, but other significant actions were also taken. Some of these were: the creation of an interim legislative committee, composed of 12 legislators and 9 members from the general public, to study during the next biennium the state's kindergarten-through-graduate-school program for public education; the expansion of the state's junior college program; the extension of the state's public-university system; and the approval of plans for a state-wide educational television network (8, pp. 8-9, 25).

While the increases in financial support and services do not mean that Florida's public school problems have been solved, it does reflect an ever-increasing understanding of school problems, a growing confidence in the leadership being provided by professional educators, and a greater awareness on the part of the lay public generally of the

importance of improving its human resources through the medium of education. With this kind of educational atmosphere pervading the state, current problems can be attacked vigorously through the combined efforts of those who earnestly desire to work out solutions in the best interest of Florida's children. Perhaps this is why the results of the 1957 legislative session have been described as "the greatest single advance for the state's public school system since the passage of the Minimum Foundation Program in 1947" (8, p. 8).

It would be a mistake to assume that these notable improvements in Florida's public school program during the past decade were accomplished without considerable study and positive leadership. At the close of World War II, when Florida's schools were facing a veritable breakdown, the problems and needs of Florida were carefully studied to determine their implications for the state-wide educational program. Between 1945 and 1947 the Florida Citizens Committee on Education carried on one of the most comprehensive studies ever undertaken in Florida (12). As a result of this multi-group, cooperative study, not to mention a host of other studies,[1] the members of the Florida Citizens Committee on Education became convinced, as did the people of the state generally, of at least three important things (11, p. 3; 12, pp. 14-25):

1. That the schools of Florida ranked considerably below the national average on most measures commonly used in evaluating a school program.

---

[1]Many types of studies were undertaken at this time: lay groups undertook to study the schools on their own initiative; groups of experts from other cities and states were employed to carry on studies; and many studies were carried on exclusively by local school people.

2. That the state was making less effort than most states to support education.

3. That the citizens of Florida desired--and were willing to pay for--schools that rate among the best in the nation.

The Minimum Foundation Program: Keystone of State Support to Education in Florida

As a result of the participation of hundreds of citizens in this intensive and extensive study between 1945 and 1947--and as a result of the effective dissemination of the findings of this study and other similar, less comprehensive studies--the people of Florida, through the efforts of an understanding, responsive Legislature, secured the enactment into law of the now-famous "Omnibus School Bill." This bill brought into being a comprehensive school plan, commonly referred to as the Minimum Foundation Program. It is this Minimum Foundation Program which now forms the keystone of state support to education in Florida. Initiated slightly more than a decade ago, this program is still permeated by the basic philosophy "that every child in Florida, regardless of the wealth of the county in which he or she lives, deserves equal minimum opportunities for an adequate education and that the state and county have a joint responsibility to provide those educational opportunities" (3, p. 5).

With the adoption of the Minimum Foundation Program by the 1947 Florida Legislature, additional funds became available to counties for teacher salaries, school buildings, transportation of pupils, and for other current expenses including the purchase of instructional materials (3, p. 3; 11, pp. 3-4). Subsequent Legislatures have financed

in full the ever-increasing cost of the state's basic school program. Significantly, the 1957 Legislature increased funds for public schools more than any other legislature in the history of the state (8, p. 9).

The Increasing Importance of State-County Cooperation

Since the county is the local unit for school organization, administration, and tax purposes in Florida, the relationship between each county and the state is of paramount importance. During the past decade the operation of the all-important Minimum Foundation Program has improved and strengthened the cooperative arrangement between each county and the state. As a result of this cooperative arrangement, the minimum level of educational opportunity has been raised throughout the counties of Florida. In addition to this, more and more planning has characterized the work of county-wide school personnel, not only with reference to the needs of individual schools, but also in terms of those environmental strengths and pressures which affect all schools throughout a county-unit school system similarly. This latter fact has focused attention on the importance of county-wide socio-economic factors and their influence in determing the ability of a county to provide educational opportunities beyond the state's minimum required level of educational expenditure under the Minimum Foundation Program. It has also stressed the importance of viewing the quality of a school system in terms of the educational attainments of those children who are in attendance throughout the numerous schools in a county.

This action does not in any way minimize the importance of the individual school program in a particular county. What it does--or can do--is enhance the possibilities for the improvement of public

education generally. The prevalence of such a viewpoint indicates that more and more people are convinced of the vital role played by education in the development of a state and in the improvement of the quality of living of its people. In other words, the educational program of a particular school is, for all practical purposes, inextricably linked with the future development of the county and state in which it is located.

Need for Study

Studies conducted in Florida prior to the enactment of the Minimum Foundation Program revealed tremendous variations in the median scores on academic achievement tests of school children in representative counties. Further, it was noted that these differences appeared to be related to differences in the median school expenditure of the counties. This finding has been interpreted to mean largely that the children in the more wealthy counties have had better background and opportunities. The same studies also revealed that white and Negro pupils showed similar general trends, although the median scores on academic achievement tests for the white school children were appreciably higher than they were for the Negro school children in the counties studied (12, pp. 58-61).[1]

---

[1]Tests designed to measure general ability to do school work were administered in the fall of 1946 to all pupils in the fifth, eighth, and eleventh grades in nine representative counties in Florida. Of the counties selected, three were selected as being representative of the counties showing the highest expenditure per instructional unit for schools; an additional three for showing average expenditure per instructional unit; and still another three showing the lowest expenditure per instructional unit.

The numerous studies made between 1945 and 1957, particularly the study made in the fall of 1946 which involved all pupils in the fifth, eighth, and eleventh grades in nine representative counties in Florida, indicated the need for a better understanding of the cultural environment which fosters and gives sustenance to education. If the schools of Florida are to be understood and improved, particularly if they are to function effectively in promoting the widest and fullest development of each pupil, then they must accept pupils as they are, endeavoring to raise them to the highest possible level of attainment in skills, understandings, personal and social adjustments, and worthy interests.

Since little can be done to alter the heredity of boys and girls who attend school, the only reasonable procedure to follow is to concentrate on the development of educational programs throughout the sixty-seven counties which are adapted meaningfully to the economic and cultural differentials which prevail throughout the state. Through the constant and continuous study of the problems encountered in both white and Negro schools--and through the implementation of programs for improvement based on the studies--it should be possible for lay citizens and educators to bring about substantial improvements in the county-wide educational programs in Florida during the coming years.

The General Problem

The purpose in this study is to obtain evidence concerning the nature of the relationship between certain cultural differentials and county-wide intelligence and academic-achievement levels of high school

seniors in Florida. Quantified census data relating to the level of adult schooling and family income were compiled and used in the development of measures of the socio-economic level for the white, nonwhite, and total population of each county included in the study. Census data concerning the composition of the population within counties and the size of each county (per cent of state population) were also used to provide the basis for certain demographic information needed in the study. Measures of county-wide intelligence and academic-achievement levels were developed from the individual test scores made by those high school seniors who participated in the Florida State-Wide Twelfth-Grade Testing Program during the years 1955 through 1957. Procedures which were used in the development and validation of the socio-economic, intelligence, and academic-achievement measures for each county represented in the study are reported in detail in Chapter III.

Three-hundred forty high schools participated in the Florida State-Wide Twelfth-Grade Testing Program in 1956, and the number of high school seniors who participated in the state-wide testing program during 1956 was approximately 25,000 (4). Viewed in terms of current population statistics and estimates which indicate that the high school enrollment will increase tremendously, these facts serve to point up the potential value of any well-done investigation which contributes to an increased knowledge of cultural influences on the conditions of learning. At a time when pupils' scores on the state-wide placement

tests have taken on added importance,[1] evidence revealed by such a study could prove of inestimable value in the area of school administration. It could also aid in the more intelligent planning and adaptation of curricula and instruction to the needs of individual schools and school communities in terms of improved educational programs throughout the sixty-seven county school systems of Florida.

Furthermore, in a state which has been attempting to establish a minimum defensible level of educational opportunities regardless of socio-economic variations among counties, the time seems appropriate to ascertain how well these attempts have fared in terms of overcoming the socio-economic handicaps of certain individual counties. The present study could point up what has been achieved as a result of the cooperative efforts of the state and counties under the Minimum Foundation Program. It could also suggest what remains to be done if every pupil in every county of Florida is to be assured of a defensible minimum standard of educational opportunity. Certainly, if administrators, supervisors, and teachers are to evaluate their instructional programs more effectively, they will need the results of up-to-date, objective studies, particularly state-wide studies which include representative groups of white and nonwhite high school pupils.

---

[1]Under a recent State Board of Control regulation, admission to the state's public universities has been restricted to those Florida high school graduates who place in the upper 60 per cent on the state-wide placement tests.

Statement of the Problem

The primary purpose in this dissertation is to investigate the relationship between certain median county-wide socio-economic and demographic measures and median county-wide intelligence and academic-achievement levels of high school seniors throughout the state of Florida. In doing this, the white and nonwhite segments of each county's population are dealt with separately and collectively. The study is specifically concerned with answering the following questions:

1. Is there a relationship between the median socio-economic level of a county and the median academic achievement of high school seniors in that county?

This relationship will be ascertained on a state-wide basis in three different frequency distributions. Since each county constitutes one case in the correlation table for the counties involved in the analytical part of the study, each socio-economic measure--levels of schooling and income--will be investigated by means of separate frequency distributions for the white, nonwhite, and total population of each county represented in the study.

2. Is there a relationship between the median socio-economic level of a county and the median intelligence level of the high school seniors in that county?

This relationship will be ascertained in the manner outlined in question one.

3. Is there a relationship between the median intelligence level of a county and the median academic achievement level of high school seniors in that county?

Here again the relationship to be investigated will involve the same procedures as outlined in question one.

4. Is there a relationship between the size of a county (per cent of state population) and the median academic achievement level of high school seniors in that county?

This relationship will be ascertained in the manner outlined in question one.

5. Is there a relationship between the per cent of nonwhites in a county and the median academic achievement level of high school seniors in that county?

This relationship will be ascertained in the manner outlined in question one.

6. Is there a relationship between the size of a county (per cent of state population) and the median academic achievement level of a county when the median intelligence level of the county is held constant by statistical methods?

This relationship will be investigated in terms of the computation of a partial r for each one of the three distributions.

7. Is there a relationship between the median intelligence level of a county and the median academic achievement level of a county when the per cent of nonwhites in the county is held constant by statistical methods?

This relationship will be investigated in terms of the computation of a partial r for each one of the three distributions.

8. Is there a relationship between the median total academic achievement level of a county and the socio-economic and intelligence levels when these two latter factors are combined with the best possible weighting by statistical methods?

This relationship will be investigated in terms of the computation of a multiple R for each one of the three distributions.

9. Is the median academic achievement level of white high school seniors in a county related to the per cent of nonwhite persons residing in the county when county-wide medians of socio-economic and intelligence levels have been held constant by statistical methods?

This relationship will be investigated in terms of the computation of a partial r for each one of the three distributions.

10. Is there a relationship between the median academic achievement level of a county and its socio-economic level when the median intelligence level of the county has been held constant by statistical methods?

Here again this relationship will be investigated in terms of the computation of partial r's involved in the three distributions.

11. Is there a relationship between the median total academic achievement level of a county and its socio-economic level when the intelligence level and size of the county have been held constant by statistical methods?

This relationship will also be investigated in terms of the computation of partial r's among the three distributions.

12. What inferences may be made concerning the variations found in the median measures of certain traits of whites and nonwhites throughout the counties represented in this study? In other words, can the county-wide median academic achievement levels of white and nonwhite high school seniors be fully understood without taking into consideration other factors? What are some of the factors which may contribute to the differences between white and nonwhite medians?

Since the answer to question twelve involves the findings of the previous eleven questions, this question will be treated as an interpretive question, the explanation being given in terms of the findings of pertinent related research and the specific findings of this study.

Major Hypothesis

There is no significant relationship between the socio-economic level of a county and the median academic achievement level of high school seniors in that county.

The hypothesis is stated in null form for purposes of statistical analysis. In this analysis the major premise is broken down into various subordinate hypotheses.

Subordinate Hypotheses

1. There is no significant relationship between each of the three measures of county-wide socio-economic levels and academic achievement levels of Florida high school seniors in the areas of English, social studies, natural science, mathematics, and total academic achievement.

2. There is no significant relationship between each of the three measures of county-wide socio-economic levels and the median county-wide intelligence level of Florida high school seniors.

3. There is no significant relationship between the median intelligence level of a county and the median academic achievement level of Florida high school seniors in the areas of English, social studies, natural science, mathematics, and total academic achievement.

4. There is no significant relationship between the size of a county (per cent of state population) and the median county-wide academic achievement level of Florida high school seniors in the areas of English, social studies, natural science, mathematics, and total academic achievement.

5. There is no significant relationship between the per cent of nonwhites in a county and the median academic achievement level of high school seniors in the areas of English, social studies, natural science, mathematics, and total academic achievement.

6. When the median intelligence level of a county is held constant by statistical methods, achievement of Florida high school seniors in the areas of English, social studies, natural science, mathematics, and total academic achievement is not significantly related to the size of a county (per cent of state population).

7. When the per cent of nonwhites in a county is held constant by statistical methods, achievement of Florida high school seniors in the areas of English, social studies, natural science, mathematics, and total academic achievement is not significantly related to the median intelligence level of that county.

8. There is no significant relationship between the median total academic achievement level of the Florida high school seniors in a county and the socio-economic and intelligence levels when these two latter factors are combined with the best possible weighting by statistical methods.

9. When county-wide medians of socio-economic and intelligence levels for the white population have been held constant by statistical methods, median achievement levels for the white high school seniors in the areas of English, social studies, natural science, mathematics, and total academic achievement are not significantly related to the per cent of nonwhite persons residing in that county.

10. When the median intelligence level of a county is held constant by statistical methods, achievement of Florida high school seniors in the areas of English, social studies, natural science, mathematics, and total academic achievement is not significantly related to the median socio-economic level of that county.

11. When the median intelligence level and size of a county have been held constant by statistical methods, achievement of Florida high school seniors in the area of total academic achievement is not significantly related to the median socio-economic level of that county.

Definitions

1. Nonwhite: "The group designated as 'nonwhite' consists of Negroes, Indians, Japanese, Chinese, and other nonwhite races" (16, p. xvi).[1] The nonwhite group is the smallest category for which facts used in the present study are reported (16, p. 31).*

2. White: This term refers to those persons who are not classified as "nonwhite," according to the 1950 Census.

3. Median: "The median, a type of average, ...is the value which divides the distribution into two equal parts--one-half of the cases falling below this value and one-half of the cases exceeding this value" (16, p. xv).

4. Academic achievement: The scores made on the American Council on Education Cooperative Tests by high school seniors in the Florida State-Wide Twelfth-Grade Testing Program during the school years 1955-56 and 1956-57. Tests were given in the following areas: social studies, English, mathematics, and general science; a total

---

[1]Following the definition, the Bureau of the Census points out that this conception of race is derived from that which is commonly accepted by the general public as reflected in the action of legislative and judicial bodies of the country. The information on race is ordinarily not based on a reply to questions asked by the Bureau of the Census enumerator but rather is obtained by observation.

*The 1950 Census (16, Table 14) shows the Negro population for the state to be 603,101, while the total for other races is 2,153. The breakdown is as follows: Indians, 1,011; Japanese, 238; Chinese, 429; and all other, 475. It should be mentioned that the Indians are not concentrated in one or a few counties in the state.

score was computed for these four areas. (For certain small counties, the scores made from similar American Council on Education tests during the school year 1954-55 have been included. The original raw scores were used.)

5. Academic achievement level of a county: The median score of those high school seniors in a particular county who participated in the Florida State-Wide Twelfth-Grade Testing Program.

6. Intelligence or academic aptitude: The scores made by the high school seniors of a county on the American Council on Education Psychological Examination, given as a part of the Florida State-Wide Twelfth-Grade Testing Program during the school years 1955-56 and 1956-57.

7. Intelligence or academic aptitude level of a county: The median score on the American Council on Education Psychological Examination by those high school seniors in a county who participated in the Florida State-Wide Twelfth-Grade Testing Program.

8. Significant: This term is used to indicate statistical significance at or beyond the 5 per cent level. This means that, in random sampling, the observed results would occur by chance not oftener than five times in a hundred.

9. Socio-Economic Index: Calculated for each county separately for the white, nonwhite, and the total population, this Socio-Economic Index consists of:

A. Median years of school completed by persons 25 years old and over, for counties: 1950 (16, pp. xx, 93-96, 106-109).

B. Median income in 1949 of families and unrelated individuals, for counties: 1950 (16, pp. 106-112).

(The median value for each component for each county was given a rank in the state; the two ranks for each county were then combined to give the index. Separate indexes were computed for the white, nonwhite, and the total or combined population.)

10. Family: A group of two or more people related by blood, marriage, or adoption and living together (16, p. xvii).

11. Unrelated individual: A person (other than an inmate of an institution) who is not living with a relative (16, p. xviii).

A. A household head living alone or with nonrelatives only.

B. A lodger or resident employee with no relatives in the household.

C. A member of a quasi-household who has no relatives living with him.

Delimitations

This study deals with counties as unit cases. It seeks to ascertain the relationship between county-wide measures of socio-economic levels and median intelligence and academic achievement test results on the Florida State-Wide Twelfth-Grade Testing Program.

While it may be true that socio-economic level may be associated with the amount of money expended in a county-wide school system, the average salary paid to teachers, and even the size of

school, it is not the purpose of this investigation to ascertain what these relationships, if any, are.

Sources of Data

The data used in this study were derived from the following sources:

1. Records of the Board of University Examiners, University of Florida, Gainesville, Florida, on the 1955-1956 and 1956-1957 American Council on Education Cooperative Tests (5).

2. The Florida Educational Directory, published by the State Department of Education, Tallahassee, Florida, October 1955, 1956, and 1957 (15).

3. The 1950 Census of Population, Volume II, Characteristics of the Population, Part 10, Florida (16).

Scope

This study is an analysis of 120,130 test scores made by 24,126 seniors in Florida white and nonwhite secondary schools in 1956 and 1957. Two-hundred thirteen white public high schools and thirty-two white private high schools were included in the study. Also, eighty-six nonwhite public high schools and one nonwhite private high school were included. The number of high schools within a county, the basic unit of this study, ranged from a low of one to a high of 23. Each of the sixty-seven counties is represented by one or more white public secondary schools. It should be mentioned, however, that only fifty counties are represented by one or more nonwhite secondary schools in this study, ranging from a low of one to a high of five nonwhite high schools.

The socio-economic indexes employed in this study were developed from data provided in the United States Census of Population: 1950 (16). The quantified census data comprise a 20 per cent sample of the adults throughout the counties represented in this study.

Procedure

The statistical procedure employed in this study was as follows:

1. Simple (Pearson Product-Moment) correlations were computed among all the variables in the study.

2. Partial and multiple correlations were computed using those variables which were critical factors in arriving at answers to the study's basic questions.

3. The significant correlations were determined or tested by the use of Snedecor's (14, p. 351) tabled values for r and R at the 1 per cent and 5 per cent levels.[1]

---

[1]The 5 per cent level of confidence was used to indicate statistical significance in the present study.

Bibliography

1. American Association of School Administrators. "Equal and Universal Access to Educational Opportunity," Paths to Better Schools. Washington, D. C.: The Association, 1945.

2. Amidon, Beulah (ed.). "Education for Our Times," Survey Graphic, 361: 564-565, November 1947.

3. Bailey, Thomas D. "Florida's Minimum Foundation Program...for Our Children," Tallahassee, Florida: State Department of Education, 1956. (Pamphlet.)

4. Board of University Examiners. "Brief Report on the Florida Statewide Annual Twelfth Grade Testing Program," Gainesville, Florida: University of Florida, 1957.

5. _____. Records of the Board of University Examiners on the 1955-1956 and 1956-1957 American Council and Cooperative Tests, 1948 High School Edition. (Mimeographed.)

6. Edwards, Newton. "Population Change: The Social and Economic Basis of a National Policy for Education," Significant Aspects of American Life and Post-War Education, 7: 167-175; Proceedings of the Thirteenth Annual Conference for Administrative Officers of Public and Private Schools. Chicago: University of Chicago Press, 1944.

7. _____. "Problems of Equality of Opportunity in Education," Review of Educational Research, 16: 46-49, February 1946.

8. Florida Education Association. "New Look at Education: The 1957 Package Program," Journal of the Florida Education Association, 35: 8-9, 25, September 1957.

9. Hart, Joseph K. The Discovery of Intelligence. New York: Century Company, 1924.

10. Lawler, Eugene S. and Lawler, Frances L. "Economic and Cultural Differentials in American Life," Review of Educational Research, 16: 32-41, February 1949.

11. Leps, Joseph M. "The Minimum Foundation Program for Education in Florida," Civic Information Series, Number 8, Public Administration Clearing Service of the University of Florida, Gainesville, Florida, 1951.

12. Morphet, Edgar L. and Others. Education and the Future of Florida. Tallahassee, Florida: Florida Citizens Committee, 1947.

13. Pierce, Truman M. and Others. White and Negro Schools in the South: An Analysis of Biracial Education. Englewood Cliffs, N. J.: Prentice-Hall, 1955.

14. Snedecor, George W. Statistical Methods: Applied to Experiments in Agriculture and Biology. Fourth Edition. Ames, Iowa: The Iowa State College Press, 1946.

15. State Department of Education. Florida Educational Directory. Tallahssee, Florida: State Department of Education, 1955, 1956, 1957.

16. United States Bureau of the Census. Seventeenth Census of the United States: 1950. Population, Vol. II, Part 10, Florida. Washington, D. C.: United States Government Printing Office, 1952.

CHAPTER II

RELATED STUDIES AND BACKGROUND RESEARCH

The purpose in this chapter is two-fold: (1) to provide a summary of the findings of previous research related to the problems of this dissertation and (2) to analyze certain aspects of the influence of socio-economic factors on the intelligence and academic achievement test scores of school children. The works of recognized authorities in the pertinent disciplines will be cited as evidence in support of the views and research findings presented in this chapter.

The role of the school in American society has been defined by the courts of the land as that of fostering and promoting the general welfare. It is this function of the American school which highlights its importance as the chief instrumentality for the perpetuation and improvement of American society.

Complex cultural differentials seem to be reflected in the characteristics of the schools and the achievement of pupils in the schools. Since the kind of schools provided by a society reflects the character of the society, the interrelationship of schools and the communities they serve has long been of interest to the political scientist, the sociologist, and the educator. A study of a school system cannot be comprehensive without data concerning the community

which supports it. The community approach to the study of educational problems provides basic data for resolving these problems.

Since this study is specifically concerned with the socio-economic levels of Florida counties and their relationship to the academic achievement and intelligence levels of high school seniors throughout these counties, the rationale above will be documented from the data and conclusions of authoritative studies, books, and research findings which bear on the over-all problem of the influence of certain environmental factors on the academic achievement and intelligence test scores of children. The related studies and background research will be presented in the following order:

1. The community approach to educational problems.
2. The pervasiveness of class structure in American life.
3. The influence of community life on human personality.
4. The influence of environmental factors on the intelligence and academic achievement test scores of children.

The Community Approach

Data which provide more precise information concerning the influence of the community on the schools, as well as the influence of schools on the community, should be of value to those responsible for the operation of schools, for those who are served by schools, and for those who are seeking cooperatively to devise better and improved ways for the schools to accomplish their purposes. In keeping with this, it seems reasonable to suggest that a group-setting or community approach to educational problems would be one way of coping with the complex

cultural differentials which permeate American life. If a further rationale is needed, the community approach has the advantage of being definitely realistic, since it views problems as integrants of community behavior and functioning (2, p. v). Melby has pointed out that the latest findings in educational and psychological research support the idea that:

> ...the human organism reacts as a totality with the totality of the environment. Education, therefore, must be concerned with the whole child, with his out-of-school as well as his in-school experience. Few, if any schools, control or even influence the child's entire environment....A schoolhouse concept of education is clearly not only inadequate but completely ineffective in providing a satisfactory environment for learning and growth.
>
> . . . . . .
>
> ...schools should never see themselves as isolated institutions separated from the rest of the community. Nor should they see themselves as the sole controlling factor in the life of the child. Only through the closest cooperation of homes, school, and community do we stand a chance to build effective education (25, p. 166).

In keeping with the concept of wholeness advanced by Melby, the following statement by Edmund de S. Brunner serves to reemphasize the importance of the community approach to problems in education:

> ...it is in communities where most people live and have their being, where they experience the impact of world trends, where they adapt to them, if they do, where in its human and group aspects, social change becomes manifest (5, p. 100).

Pervasiveness of Class Structure

While it may be deplored by many Americans in all walks of life, it nevertheless is realistic to recognize the fact that American community life is characterized by a hierarchical set of social classes. In a

detailed study of one of the older New England communities, six distinct social classes were identified (46, 47). Jones (19), in studying the Negro population of a small Southern town, revealed that social stratification was a very real thing in the everyday lives of the people of the community. The revelation of this factual evidence of the pervasiveness of class structure in American life is making it clear to more and more people that the social ladder in American life is rather difficult, if not impossible, for millions of Americans to climb. Figures 1, 2, and 3 reveal graphically that the social ladder in American life today, whether it be measured in terms of income, occupation, or education, has a very pointed apex (2, pp. 188-190).

In attempting to predict the social attainments of the millions of babies born each year, Bernard has expressed the belief that:

> ...only a few will ever reach the top of the social ladder. Most of them will be stopped somewhere along the line. The ladder is mined--if such a mixed figure is permissible--with booby traps bearing such names as "lack of money," "lack of opportunity," "lack of education,"...[and]..."poor family environment" (2, p. 190).

Numerous studies by psychologists, social workers, sociologists, and educators show that these social inequalities are influential in the development of human personality. One research team states that:

> The marks of social status appear in a person almost as soon as the genes which he inherits from his parents' bodies display themselves in observable characteristics, and it becomes impossible to tell how much of the person is due to heredity and how much to environment (45, pp. 149-150).

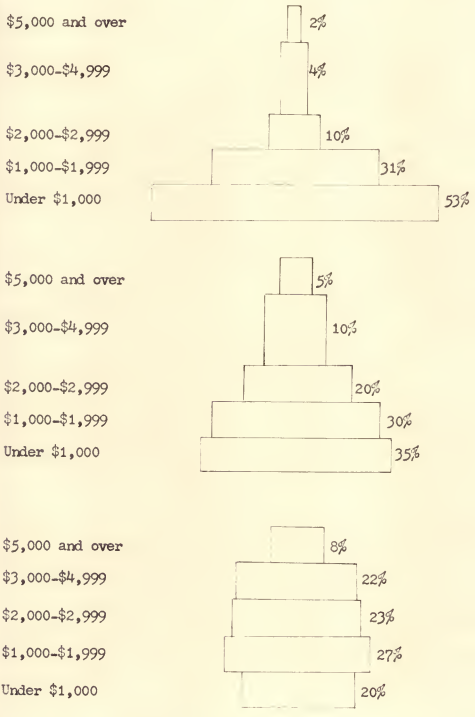
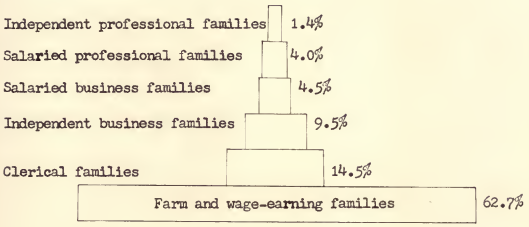


Figure 1. Distribution of Family Income in the United States at Three Different Periods: Top, 1935-1936; Center 1941; Bottom 1945. Adapted from Bernard (2, p. 188).



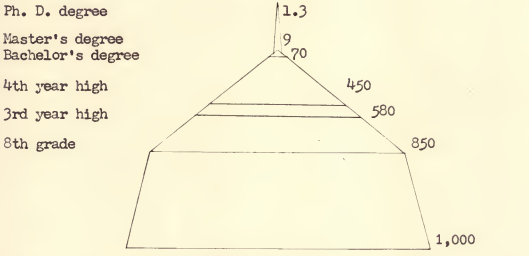


Figure 2. Measures of Occupational Level and Social Status in the United States: Top, Occupational Level (Retirement and other factors account for a total less than 100%); Bottom, Educational Level (Based on typical results). Adapted from Warner, Havighurst, and Loeb (44, Chapter 4); Bernard (2, pp. 188-189). No date given.

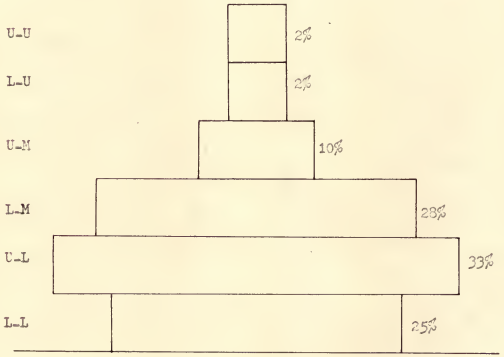


Figure 3. Social Structure Ladder. Adapted from Bernard (2, p. 190).

U-U = Upper Upper
L-U = Lower Upper
U-M = Upper Middle
L-M = Lower Middle
U-L = Upper Lower
L-L = Lower Lower

The presence of class and caste barriers[1] poses a serious problem for most American communities. While the schools, with community support, can do much to offset social competition, they cannot prevent the inequalities which result from family, class, and caste environments (2, p. 203).

This is not to say that the community, through its schools, can do nothing to help and assist the disadvantaged. Instead of tacitly accepting the class system, as it is revealed in the lives of those attending school, the schools, with community support, can encourage and foster the development of talent wherever it appears, seeing to it that no obstacles stand in the way of its realization. As has been suggested by a group of noted sociologists, the need of the times is to spread the net wider to find people of talent wherever they exist, thereby encouraging them to compete for the prized positions in American life (45, p. 162).

In expressing his philosophy of education, John Dewey has emphasized that:

> ...all social institutions have a meaning, a purpose. That purpose is to set free and develop the capacities of human individuals without respect to race, sex, class, or economic status. And this is one with saying that the test of their value is the extent to which they educate every individual into the full stature of his responsibility. Democracy has many meanings, but if it has a moral meaning it is found in resolving that the supreme test of all political arrangements shall be the contribution they make to the all-around growth of every member of society (10, p. 186).

---

[1]When one group is kept permanently in an inferior position, a caste system is said to exist. The relationship between Negroes and whites constitutes the major caste cleavage in most American communities today.

In the midst of overwhelming evidence of class influences in education (15, 16, 44, 45, 47), the forthright statement by Dewey serves as a reminder that much remains to be done if the fullest development of the unique capabilities of all the children in American society is to become a reality. The accomplishment of this task is further hindered by those skeptics who insist that any person who desires an education can get it nowadays. These skeptics choose to ignore, or fail to understand, the import of the ever-increasing evidence that class and caste inequalities pervade American life.

In reporting the conclusions of a study dealing with this problem of cultural differentials in American society, Dr. Floyd Reeves, in testifying before the Senate Committee on Labor and Education, indicated that:

> ...the most important single reason why youth from 14 to 17 years of age were not in school...was... because the incomes of their families were so low that they could not afford to buy clothes and shoes and lunches and sometimes the books and school supplies that these young persons needed in order to attend school (33, p. 529).

The conclusions expressed by Dr. Reeves are corroborated in many of the studies which are quoted below. Further, what Dr. Reeves has concluded in regard to individual educational opportunities applies as well to communities as a whole. In other words, community inequalities are an everyday reality, and many children are denied educational opportunities simply because they are being reared in communities which are impoverished culturally as well as economically (11, 32 Chapters V and VI).

The Influence of Community Life on Personality

Since communities vary widely in many ways, it is only reasonable to expect different psychological atmospheres to accompany them. Although it is difficult to document instances of community variations in psychological atmospheres, the Bureau of Agriculture Economics (24) has published the findings of a study which does precisely this.

Two communities in the San Joaquin Valley in California were selected for this study because they were almost identical in terms of the criteria chosen except for the size of their farms. Further analysis revealed that the two communities were different in other respects, particularly in the area of occupational status. The small-farm area of Dinubia consisted of a large number of small, independent businessmen, whereas the large-farm area of Arvin was made up mainly of employer laborers. The results in economic structure of the two communities were striking indeed. Dinubia could boast of such things as paved streets, brick buildings and furniture stores, while the town of Arvin was generally dust-ridden, having only one paved street, and this one paved street poorly lighted at that. Housing in Arvin consisted mainly of impermanent-looking, poorly-built, wooden shacks, jammed together two on a lot. By way of further contrast, in Dinubia, $232.00 went for furniture for every $100.00 for liquor, whereas in Arvin the ratio was $103.00 to $100.00. While Dinubia had five service and commercial organizations, two fraternal organizations, four women's clubs, and two scout troops, Arvin had two service and commercial organizations, no fraternal or women's clubs at all, and one scout troop.

Since the influence of community background plays a role comparable to that of the family in shaping personality, including attitudes, speech patterns, prejudices, and points of view (2, p. 559), the cultural patterns siphoned from the communities of Dinubia and Arvin would certainly tend to indicate a more beneficial environmental influence on the personalities of the children and adults of Dinubia.

Convinced that community differences are reflected in opportunities afforded to children, E. L. Thorndike (41) studied 310 American cities and found that they differed markedly in what he called "goodness," as measured by a composite score of such items as infant death rate; expenditure for recreation; value of schools, parks, and other property; expenditure for schools; and school attendance, to mention but a few. In a later study in which he attempted to ascertain the esthetic rating of certain cities in terms of such items as houses, yards, shop window displays, and other indicants of esthetic qualities, Thorndike found similar wide differences (42).

A further illustration of the intellectually limiting effect of impoverished community institutional offerings is provided in a study by two psychologists of five isolated communities in the Blue Ridge Mountains (35). The study of isolated mountain children indicated that, although the isolated communities produced the most impoverished personalities, they protected their members from the stresses and strains of modern life.

In investigating community influences on racial attitudes, one investigator gave a number of personality tests to young Negroes in different kinds of communities. His findings indicated that the test results were clearly associated with community backgrounds. Bitter and

hopeless attitudes were found in those communities where segregation was rigidly enforced, particularly where there was competition between poor white workers and Negroes. This study further indicated that Negroes in urban communities--both North and South--displayed less hostility toward whites than did the rural plantation Negroes (18, p. 305).

Community influences were found to have a profound influence on the Negro's attitude toward himself. Race pride was found to be at its lowest point in southern plantation communities. While there was more race pride in the southern urban communities than existed in the plantation communities, the highest degree of race pride was found to exist in the northern cities (18, pp. 252-254). One of the most significant aspects of this study was the finding that race attitudes seemed to be related to specific community backgrounds and the kind of racial mores which prevailed in these communities. In other words, the racial attitudes could not be attributed to specific regions of the country. Thus it appeared that the kind of community in which these young Negroes lived was a significant factor in determining their attitudes toward whites and themselves (18, p. 311).

Studies Indicating the Influence of Environmental Factors on the Intelligence and Academic Achievement of Children

I. The Intelligence of Children

While no one is in a position to state what constitutes an optimal environment for any given individual, few investigators, if any, hold that environmental influences have no effect upon the intelligence of children. In reviewing the literature dealing with this

aspect of the nature-nurture problem, an attempt was made to select only those studies that appear to make a contribution to the over-all study as well as to the problem of environment in relation to the intelligence of children. The studies selected have been grouped under three headings: (1) specific home influences, (2) general home, school, and community conditions, and (3) institutional environments.

1. Home Influences.--Any discussion of home influences upon the lives of children must of necessity include the consideration that all children are subjected to numerous environmental forces simultaneously. As has been indicated previously, each individual reacts as a totality with the totality of his environment (25, p. 166). While it may be impossible to separate community influences from home influences completely, it does seem reasonable to assume that such a condition can be approximated in the lives of many pre-school children.

Numerous investigations of home influences have been made in terms of ascertaining the relationship between the intelligence of children and the occupations of their fathers. Neff (28) reviewed sixty-three studies involving groups of children whose fathers were rated on an occupational continuum--from professional classes to unskilled common laborers. His findings indicated that, in general, the children whose fathers were in the lowest occupational group scored an average of 20 points lower than did the children whose fathers were in the highest occupational (professional) group. In interpreting his findings, Neff concluded that:

> ...all the summarized studies tend to show that low cultural environment tends to depress IQ approximately to the degree agreed as characteristic of laborers' children, and that a high environment raises IQ correspondingly. All, then, of the twenty-point mean difference in IQ found to exist between children of the lowest and highest status may be accounted for entirely in environmental terms (28, pp. 754-755).

In studying the results of Stanford-Binet examinations of 608 Oklahoma school children, Hildreth (17) found an even greater divergence between the average scores of the highest and lowest occupational groups. She found the difference between these extreme groups to be 37.3 IQ points (17, pp. 153-157).

In an extensive study based on individual examinations of the IQ of children in relation to occupation, Terman and Merrill (40) reported results for four age groups: 2 to $5\frac{1}{2}$ years, 6 to 9 years, 10 to 14 years, and 15 to 18 years. The findings of the Terman-Merrill study revealed a wide range in IQ between the professional and day-laborer groups. While the pattern was substantially the same at different ages, the average IQ among the four groups varied from 18.9 to 20.3 IQ points. Despite the fact that these findings showed considerably less variation than the study by Hildreth, they support the conclusions advanced by Neff, illustrating the general trend of relationship between the IQ of a child and the occupational status of his father.

In ascertaining the relationship between education of parents and the IQ's of their children, Goodenough (12) found correlations for boys and girls at age 3 that yielded higher relationships than at 2 or 4. In a cumulative study from infancy to six years, Bayley and Jones (1) showed a negative relationship until after 18 months of age.

From 24 months to 72 months, the correlations with mother's education were found to be consistently higher than those with the father's education. This finding was partially explained on a nurtural basis, since there is greater association of child with mother during pre-school years.

2. General Home, School, and Community Conditions.--In a study which provides an abundance of evidence in support of mental differences in relation to differential environmental experience, Newman, Freeman, and Holzinger (29) compared 19 pairs of identical twins who had been reared virtually separately over a long period of years. Employing an environmental rating on education, social, and physical influences--a rating arrived at on the basis of the estimates of five judges--the study yielded a series of remarkable correlations. The relevant correlations, cited in Table 1, lend support to the investigators' conclusions that "differences in educational and social environments produce undeniable differences in intelligence and scholastic achievement as measured by our tests" (29, p. 341).

TABLE 1*

CORRELATIONS BETWEEN TWIN DIFFERENCES ON CERTAIN TRAITS AND THREE ESTIMATED ENVIRONMENTAL DIFFERENCE RATINGS

Traits	Environmental Difference Rating		
	Educational	Social	Physical
Height	-.02	-.01	-.18
Weight	-.10	.23	.60
Binet IQ	.79	.51	.30
Otis IQ	.55	.53	-.23
International Test	.46	.53	-.03
American Council Test	.57	.32	.08
Stanford Educational Test	.91	.35	.14

The study by Newman, Freeman, and Holzinger (29) is in accord with the general theme of increased intelligence associated with improved educational conditions. By reporting a correlation of .79 between magnitude of differences in educational opportunities and magnitude of differences in Binet IQ for identical twins separated and reared apart, the findings indicated that physical traits were least affected by environment, that ability and achievement were more affected, and that personality traits were most affected.

Intelligence and Racial Factors

In recent years there has been a vigorous search for various categories or frameworks within which predictions of mental status and academic achievement might become more reliable. Various measures of factors of socio-economic status have been tested in terms of their

*Adapted from Newman, Freeman, and Holzinger (29, p. 340).

relationship to intelligence and academic achievement. Other studies have been made to ascertain relationships which may exist between race, intelligence, and academic achievement.

Research on the mental ability of the American Negro has been going on for the past half century or more. The results of conventional tests of intelligence indicate that the average scores of Negroes are typically lower than those of whites (30, p. 4). Advocates of a theory of white mental supremacy have interpreted this finding as evidence of the Negro's "racial inferiority." It took the published reports of the mental ratings for recruits on the World War I Army Alpha and Army Beta tests to present a positive argument against the theory of a racial difference in mental ability. Covering approximately 1,750,000 men, these tests revealed the following average scores (30, p. 4):

GROUP	ALPHA TEST (Literates)	BETA TEST (Illiterates)
White	59	43
Northern Negro.	39	32
Southern Negro.	12	20

Significant as the finding was that northern Negroes were consistently superior to the southern Negroes, an even more significant finding was the revelation that "the Negro recruits from three of the highest scoring states had higher averages than whites from the lowest scoring southern states" (30, p. 4). The following Alpha test (given to literates) results reveal this significant finding (30, p. 4):

WHITES			NEGROES		
STATE	NUMBER OF CASES	MEDIAN SCORE	STATE	NUMBER OF CASES	MEDIAN SCORE
ARKANSAS	618	41.0	NEW YORK	850	44.5
KENTUCKY	832	41.0	OHIO	152	48.8
MISSISSIPPI	665	40.3	ILLINOIS	578	46.9

The revelation that the average score of Negroes in some northern states was higher than that for whites in certain southern states precipitated a widespread controversy (49, 50).

In interpreting this finding, the idea was advanced that Negroes who came North represented the upper levels of their race in mental ability. Klineberg (20), however, in his exploration of this aspect of selective migration, studied children whose parents had moved from Birmingham and Nashville to New York City. Although he was unable to find any evidence of a mental selection with respect to the children involved, he did find that the intelligence quotient of the children increased with the number of years' residence in New York City. As a result of his investigation, Klineberg concluded that:

> There is, in fact, no evidence whatever in favor of selective migration. The school records of those who migrated did not demonstrate any superiority over those who remained behind. The intelligence tests showed no superiority of recent arrivals in the North over those of the same age and sex who were still in the southern cities. There is, on the other hand, very definite evidence that an improved environment, whether it be the southern city as contrasted with the neighboring rural districts, or the northern city as contrasted with the South as a whole, raises the test scores considerably; this rise in "intelligence" is roughly proportionate to the length of residence in the more favorable environment (20, p. 59).

While it may be virtually impossible to rule out the theory of some selectivity in migration, other studies in various parts of the country indicate that this superiority of northern Negroes over southern Negroes and some southern whites is attributable to environmental factors* (29, p. 340; 30, p. 4; 38, p. 247).

Additional supporting evidence is provided in studies by Gordon (13) on canal-boat children and by Sherman and Key (35) on children in isolated mountain communities. By revealing large decreases in IQ test scores with age, these studies are in accord with the general theme of increased intelligence associated with improved educational conditions and decreased intelligence associated with the intellectually limiting effects of impoverished home and community life.

3. Institutional Environments.--Many studies have been undertaken to ascertain what happens to the mental development of children when they either remain in a particular institution or are shifted from one institution to another. Lithauer and Klineberg (21) found a median gain in IQ of 6.3 points by 120 children examined shortly after admission to an orphanage and retested after a period from 3 to 57 months.

Crissey (9) studied changes in IQ of children in an orphans' home, a juvenile home, and two schools for the feeble-minded. His findings indicated that, in general, there was a loss in IQ with

---

*A recent book by Shuey takes a contrary point of view. In making a summary of the studies of Negro-white differences in mental-test performances in the United States over the past forty years, Dr. Shuey has concluded that "the remarkable consistency in test results.../points/... to the presence of some native differences between Negroes and whites as determined by intelligence tests" (36, p. 318).

continued institutional residence, this loss being greater for the children in feeble-minded institutions than for the others.

In a study which extended over a three-year period, Skeels, Updegraff, Wellman, and Williams (37) studied two matched groups of orphanage children of preschool age. The experimental group attended the orphanage preschool; the control group did not. The groups were matched on the basis of IQ, age, sex, length of residence in the orphanage, and nutritional status. It was found that over the longest residence period studied (400 or more days) the non-school children who initially tested 80 or above in IQ lost 16.2 points, while the preschool children of those initial levels gained 0.5 points.

Reymert and Hinton (34) studied the case histories of 100 children who had been in the superior environment of Mooseheart[1] for at least four years. After dividing the subjects into age levels--under 6; 7, 8, 9; and 10 to 14--it was found that children of six years and under, both individually and collectively, showed a significant gain in IQ after one year's residence at Mooseheart. The other groups showed no significant gain. When the subjects were again divided into two groups according to IQ--one group ranging from 70 to 94; the other from 95 to 130--it was found that little change in IQ was made by the children at Mooseheart.

---

[1]Mooseheart, founded in 1913 and located in Mooseheart, Illinois, is owned and operated by the Loyal Order of Moose as a home and school for dependent children of deceased members of the Order.

In interpreting these results, it has been noted that the preschool group which showed a significant rise in IQ had had the benefit of nursery and kindergarten training, whereas the older group had had no such training.

In an effort to ascertain the effect of different conditions of schooling upon later mental development, Wellman (48) conducted a study which carried preschool children through consecutive periods of growth into high school and college. As a result of this study, Wellman concluded that gains in IQ associated with preschool attendance in the Iowa University School were meaningful in terms of later development.

While the studies cited may be said to represent only a few segments of the complex problem of environmental influences, much effort has been made to compare differences in mental growth with differences in educational conditions. These studies indicate that environmental factors are closely related to IQ and academic achievement test scores.

II. The Academic Achievement of Children

Most of the evidence in the previous part of this chapter indicated a noticeable departure from the oft-heard statements about the constancy of the IQ and the inheritance of intelligence. Additional evidence will be presented in the remainder of this chapter, not only in support of the point of view that intelligence is modifiable, but also that intelligence and academic achievement test scores are influenced to a considerable extent by environmental forces. Since this study is concerned primarily with the relationship between the socio-economic levels of counties of Florida and the average intelligence and academic achievement test

scores of high school seniors among these counties, the influence of environmental forces on intelligence and academic achievement test scores will be discussed in the following order:

1. Environmental influences on intelligence and academic achievement test scores.

2. Selected group-setting studies bearing on the matter of academic achievement test scores.

3. Florida group-setting studies bearing on the matter of academic achievement test scores of children.

Environmental Influences on Intelligence and Academic Achievement Test Scores

Since the time of Alfred Binet, the great French educator and psychologist who postulated the concept of the modifiability of intelligence (3, pp. 336-337), the literature has run the gamut with respect to the controversial aspects of the nature-nurture problem. While the controversy rages in some quarters, it is appropriate to recall a citation, written some thirty years ago, by the late Dr. Lewis Terman. In his introduction to the Twenty-Seventh Yearbook of the National Society for the Study of Education, Dr. Terman revealed his grasp of the complexities of the contributions of nature and nurture to intelligence and achievement of children and adults when he said that:

> We are interested in the child or adult as he comes to us--with his unique complex of ancestry, associates, home training, schooling, and physical and moral attributes. We are interested, not in finding out how he would have developed if he had had no environment at all; rather we wish to discover whether or not he can be made a more intelligent individual or a more learned

> one by improving the condition of his milieu within the limits found in reasonably good social communities. More generally, we wish to find the relative potency of all types of human environment, and to know the limits placed upon achievement by endowment (39, pp. 2-3).

While early compilations of research recognized the fact that heredity and environment both condition the process of growth, little emphasis was given to the inextricable aspect of this relationship. The numerous studies contained in the Twenty-Seventh Yearbook of the National Society for the Study of Education, a yearbook devoted exclusively to the influences of nature and nurture upon intelligence and achievement, represent a case in point. According to Stoddard, these particular studies were organized with the thought that heredity and environment could be separated in so far as differential effects were concerned (38, p. 331). As chairman of the committee which prepared the Thirty-Ninth Yearbook, regarded as sequential to the Twenty-Seventh Yearbook, Stoddard has insisted that:

> It is essential to think of the contributions of heredity and environment, not as mutually exclusive or diametrically opposed, but rather as close-coupled factors whose impingement is mutually interacting. Environment does not act upon heredity (who would say that heredity acts upon environment?); rather various combinations of factors and forces, with different origins, produce measurable results in child development (38, p. 322).

Re-enforcing the views of Terman and Stoddard and going a step further in terms of supplying a needed corrective in the measurement of intelligence within a cultural context, Lorimer and Osborn have stated that:

> It is important to recognize at the start that "intelligence," as measured by mental tests, is something far more fundamental than mere accumulation of information, but nevertheless something that is, in part, the product of environmental forces and that can only be measured through the medium of responses that have been, in part, socially conditioned. Intelligence is ability to deal systematically with symbolic materials, such as words and numbers, or to organize concrete materials in space and time so as to carry out definite aims or directions; it is, in short, the ability to learn and to reason. Yet such an ability at any time in the life of an individual is a developed ability. It is determined in part by hereditary physical factors and in part by the habits of life of the family and the community in which the individual has been brought up. For this reason we shall constantly refer to the trait that we are considering as "cultural-intellectual development." Many may consider this term unnecessarily awkward. Most psychologists will probably feel that we overdo this constant reiteration of the role of cultural patterns in influencing intelligence test performance. Nevertheless, in view of the widespread popular misconception of "I..'s" as immediate indices of innate abilities, we feel that this constant reference to the cultural aspect of intellectual development is warranted (22, pp. 113-114).

Cook (8, p. 1465) has provided a further elaboration on the previous statements in regard to academic achievement and intelligence testing:

> Although the terms "achievement" and "achievement testing" have been widely used for a number of years, little attention has been given to the definition of achievement. In the field of measurement, achievement is generally used in the sense of acquired "ability to do, capacity to do, or tendency to do." But a person's performance (behavior) is conditioned by the attending circumstances, and acquired abilities, capacities, and tendencies may change. Hence a more complete definition of achievement would include specification relative to the circumstances, including time, under which the designated ability to do, capacity to do, or tendency to do is to be thought of as functioning. The specific circumstances may be those attending the best performance, but usually

there is the implication that the measure of achievement (test score) is a description of the performance to be expected at some future time.

. . . . . .

...Since achievement is generally used in the sense of acquired abilities, capacities, and tendencies, the relatively high correlations between intelligence-test scores and achievement-test scores in reading, arithmetic and other academic subject-matter areas has been interpreted by some as evidence that the achievement-test performance in such cases represents intelligence plus acquired abilities, capacities, and tendencies. It must be remembered, however, that intelligence is never measured directly; intelligence tests are simply achievement tests of a special type from which intelligence is inferred. The intelligence test is an achievement test measuring the ability to perform successfully in situations involving a broad sample of abstract relationships and problem-solving abilities which, it is assumed, everyone taking the test has had an equal opportunity to learn. Since differences in achievement in these more permanent learnings are found, it is inferred that native capacity is responsible for them. Such an inference is correct to the extent that the basic assumption of equal opportunity to learn is true and to the extent that capacity for learning measured by the test may be labeled intelligence. Equal opportunity to learn implies not only equal environmental conditions but also equal sensory capacities, energy, vitality, interests, motivation, etc. It is a well-established fact that the capacity for achievement in any area may be inferred more accurately from an achievement test in that area than from a general intelligence test, if the assumption of equal opportunity to learn is verified. Hence, achievement tests are always measures of acquired abilities, capacities, and tendencies, from which intelligence or capacity to learn may sometimes be inferred (8, p. 1465).

As had been pointed out previously, the community approach to educational problems provides a realistic way of recognizing the many influences which combine to form the sum total of forces acting upon a school system, particularly a county-wide school system (2, p. v). Pierce has noted that "these influences fall roughly into

administrative and structural factors, staff characteristics and community factors forming the background of the school. The extent to which community factors may be related to the quality of education indicates differences in community capacity to produce education; for it is well known that communities vary widely in terms of specific measures by which they may be gauged" (31, p. 6).

In an earlier study of the adaptability of the Pennsylvania school system, Mort and Cornell found that, next to expenditure, the type of community and the size of the school were most closely related to the quality of a school's educational program (27, pp. 109-124). In interpreting some of the findings in connection with the Pennsylvania Study, Vincent has commented that:

> When the effects upon community differences in character of education of fourteen factors are, one by one, partialled out, it is shown that only four of them (dealing with education, age, and occupation of the population) are sufficiently strong to eliminate statistically significant variations by community types in character of education. To explain how factors of education, age, and occupation of the population could possibly operate to affect the quality of schools, the hypothesis is tenable that the psychological influence of these factors flows from the permits and demands of a better informed public (43, p. 39).

The previous comments by Pierce (31), Mort and Cornell (27), and Vincent (43) suggest that the picture in the public mind of what a school is like--and what a school should do--goes a long way toward determining the quality of education in a particular community. It is appropriate to consider an extensive study by Coleman (7) in which a determined effort was made to ascertain if there were any pronounced variations in the academic performances of children who came from

strikingly different socio-economic levels. While the study involved directly 4,784 children in the seventh, eighth, and ninth grades, these children comprised the highest 5 per cent, middle 5 per cent, and lowest 5 per cent in socio-economic status of a school population of some eighteen thousand junior-high-school pupils. With respect to academic achievement, Coleman found that the children in the upper 5 per cent according to socio-economic status were superior to those in the middle 5 per cent, and these, in turn, were superior to the children from the lowest 5 per cent. Coleman also found rather striking differences in the measured intelligence of the children from these varying socio-economic levels. A major conclusion of Coleman's study was that the children from the favored environment (highest 5 per cent) were, on the average, achieving less in proportion to their tested intelligence than were the children from the lowest environment (lowest 5 per cent) in terms of their tested intelligence (7, p. 62).

In a study of 270 neighborhoods in New York City, Maller (23) found that the neighborhoods which rated low in economic status were also low in rate of school progress. Corroborating the findings of Coleman (7), Maller noted that the correlation of school progress with a composite of socio-economic factors, including value of homes and median annual expenditure per family, was higher than its correlation with intelligence (23, p. 670). As a result of this study, Maller concluded that:

> ...educational achievement cannot be considered in isolation from the correlated psychological, social, and biological factors in the school's environment. A school located in a "poor" neighborhood (with low

> economic status, a high rate of juvenile delinquency, infant mortality, and so forth) will have a slow rate of progress....
> . . . . . .
> When the background factors are considered, it appears that some schools whose records show rapid progress are nevertheless below the expected level, while other schools whose rate of progress is low are actually exceeding the expected level of progress....

Maller goes on to state that:

> ...the degree of progress to be expected of a given school should not be based upon an arbitrary standard but upon the nature of the pupils and the social and economic background of the neighborhood (23, p. 670).

Using The Iowa High School Content Examination as his measure of academic achievement, Bullock (6) investigated the academic performances of white and Negro high school graduates who had attended Texas public high schools under segregated conditions. Of the 1697 students used in the study, 503 were white students; 1194 were Negro students. All students involved in the study were, at the time the test was administered, enrolled in Texas colleges for the first time having received less than one-half of one semester of college training. Seeking to test the hypothesis that "differential provision for the education of white and Negro pupils gives one group a handicap sufficient to place it below the other in performance on a common test..." (6, p. 179), Bullock found that the facts in his research pointed to the general conclusion that Negro pupils, assuming equality of academic aptitude, achieved less well than white students. In interpreting this result, Bullock went on to state that:

> ...differences that may be shown to exist between white and Negro students as to how much they know after finishing high school may be attributed not only to differences in their respective schools but also to differences in their respective ways of life (6, pp. 181-182).

Florida Group-Setting Studies Bearing on the Matter of Academic Achievement Test Scores of Children

Prior to the adoption of the Minimum Foundation Program in Florida in 1947, numerous studies were undertaken to ascertain the differences in educational opportunity and attainment among the various counties of Florida. One of the most extensive and effective studies ever to be undertaken in this connection was a study sponsored by the Florida Citizens Committee. In the fall of 1946, The California Mental Maturity Tests and The Stanford Achievement Tests were administered to all children in grades five, eight, and eleven in the public schools of nine representative Florida counties.[1] As a result of this state-wide study, the Florida Citizens Committee concluded:

1. There is a consistent tendency for the median standing of the pupils in each of the selected counties to parallel the county's standing on income per instruction unit. This seems to mean largely that the pupils in the more wealthy counties have had better background and opportunities. The differences in the highest and lowest income counties are large. In the same grades, the pupils in the highest income counties average more than one year higher than those in the lowest income counties. It is significant that this difference becomes more pronounced in the later grades.
2. There is a slight tendency for the pupils in the larger schools to show superior ability to those in the smaller schools, even in the same county.
3. In all the participating counties, the range in ability of those in the same grade is quite large. Thus all

---

[1]Of the counties included in the study, three were selected as being representative of those counties showing the highest expenditure (income) per instructional unit; an additional three for showing an average expenditure (income) per instructional unit; and still another three for showing the lowest expenditure (income) per instructional unit.

> the counties are confronted with the problem of adjusting their school offerings to a wide range of abilities.
>
> . . . . . .
>
> 5. The median mental ability of the white pupils in the participating counties compares quite favorably with the national median. The pupils in the high income counties are about one-half to one year above the national median; the average income counties tend to agree with the national median; and the low income counties are about one-half to one year below the median (26, p. 58).

Boles (4) and Hall (14), in analyzing the intelligence and academic achievement test scores made by seniors in selected Florida white high schools, corroborated the earlier findings of the Florida Citizens Committee (26) and provided additional evidence in terms of these findings. In both instances, they concluded that academic achievement, as measured by the Florida State-Wide Twelfth-Grade Testing Program, is greater in large schools than in small schools.[1] Boles' study did not specifically treat or consider socio-economic factors. Concerned primarily with the academic achievement test scores of seniors in the smaller high schools of the state, Hall's study dealt with the influence of certain socio-economic factors on the individual pupil in small high schools. As a result of his state-wide study of small high schools, Hall concluded that:

> Differences in ability and in home and family backgrounds account for much of the obtained achievement differences. Of those factors considered in this study, the three which are most closely associated with achievement, listed in descending order of this association, are: (1) ability as measured by the ACE Psychological test, (2) educational level of parents, and (3) economic status of family (4, p. 118).

The principal purpose in this study is to extend the approach used by Hall to include county-wide and state-wide relationships between

---

[1]Hall used 35 white schools ranging from less than 50 pupils to more than 500. His conclusions on size and achievement did not hold when he held intelligence constant.

socio-economic factors and intelligence and academic achievement levels of high school seniors among the counties of Florida.

Summary

This chapter has presented a defense of the group-setting or community approach to educational problems as a realistic way of coping with the complex cultural and economic differentials which permeate American life. Numerous studies were cited in support of the contention that American life is characterized by a hierarchical set of social classes. In disucssing the pervasiveness of class structure in American life, evidence was presented which indicates that cultural patterns are siphoned from the environmental influences of communities to the personalities of the children and adults who live in them. Studies were reported in which community differences were reflected in the opportunities afforded children. It was revealed that many children are being denied educational opportunities simply because they are being reared in impoverished communities.

In the review of literature dealing with the nature-nurture problem, only those studies were reported that appeared to contribute to a better understanding of the problem of environment in relation to intelligence test scores and academic achievement test scores of children. While the controversy in regard to the relative contribution of nature or nurture to the intelligence and attainment of children still rages in some quarters, the studies selected and reported in this chapter support, in general, the following significant ideas:

1. That human intelligence, as measured by available tests, is modifiable.

2. That most of the available evidence has not shown that the races differ significantly in inherited mental ability.

3. That increased intelligence test scores and academic achievement test scores are associated with improved educational conditions, while decreased intelligence test scores and academic achievement test scores are associated with the intellectually limiting effects of impoverished home, school, and community environments.

4. That the effects of heredity and environment, since they are a part of the same process of growth, cannot be separated in the life of an individual.

5. That remarkably few investigators hold that environmental influences have no effect upon the intelligence test scores and academic achievement test scores of children.

6. That equalization of educational opportunities through some form of statewide minimum foundation program tends to minimize the undesirable effects of the more impoverished environments.

Bibliography

1. Bayley, N. and Jones, H. E. "Environmental Correlates of Mental and Motor Development: A Cumulative Study from Infancy to Six Years," Child Development, 8:329-341, 1937.

2. Bernard, Jessie. American Community Behavior. New York: The Dryden Press, Inc., 1949.

3. Binet, Alfred. Les Idees Modernes sur Les Enfants. Paris: Ernest Flammarion, 1911. Cited from Stoddard, George D. The Meaning of Intelligence. New York: The Macmillan Company, 1949.

4. Boles, Ralph Carroll. "Some Relationships Between Size of School and Academic Achievement of High School Seniors." Unpublished doctoral dissertation, College of Education, University of Florida, 1952.

5. Brunner, Edmund de S. "Sociology Tomorrow," Rural Sociology, 11:100, June 1946.

6. Bullock, Henry Allen. "A Comparison of the Academic Achievement of White and Negro High School Graduates," Journal of Educational Research, 44:179-192, November 1950.

7. Coleman, H. A. "The Relationship of Socio-Economic Status to the Performance of Junior High School Students," The Journal of Experimental Education, 9:61-63, September 1940.

8. Cook, Walter W. "The Nature of Achievement and Meaning of Its Measurement," The Encyclopedia of Educational Research (Walter S. Monroe, editor). New York: The Macmillan Company, 1950.

9. Crissey, Orlo L. "Mental Development as Related to Institutional Residence and Educational Achievement." University of Iowa Studies in Child Welfare, Vol. 13, No. 1, Iowa City, 1937.

10. Dewey, John. Enlarged edition. Reconstruction in Philosophy. Boston: The Beacon Press, 1948.

11. Edwards, Newton. "Problems of Equality of Opportunity in Education," Review of Educational Research, 16:46-49, February 1946.

12. Goodenough, F. L. "The Relation of the Intelligence of Preschool Children to the Education of Their Parents," School and Society, 26:54-56, 1927.

13. Gordon, H. Mental and Scholastic Tests Among Retarded Children: An Inquiry into the Effects of Schooling on the Various Tests. London, England: Board of Education, 1923.

14. Hall, Morrill M. "A Study of Some of the Relationships Between Size of School and Selected Characteristics of Students, Teachers, and Principals." Unpublished doctoral dissertation, College of Education, Florida State University, 1956.

15. Havighurst, Robert James and Taba, Hilda. Adolescent Character and Personality. New York: J. Wiley, 1949.

16. Hollingshead, August de Belmont. Elmtown's Youth. New York: J. Wiley, 1949.

17. Hildreth, G. "Occupational Status and Intelligence," Personnel Journal, 13:153-157, 1934.

18. Johnson, Charles S. Growing Up in the Black Belt. Washington, D.C.: American Council on Education, 1941.

19. Jones, Clifton R. "Social Stratification in the Negro Population: A Study of Social Classes in South Boston, Virginia," The Journal of Negro Education, 15:4-12, Winter 1946.

20. Klineberg, Otto. Negro Intelligence and Selective Migration. New York: Columbia University Press, 1935.

21. Lithauer, D. B. and Klineberg, Otto. "A Study of the Variation in IQ of a Group of Dependent Children in Institution and Foster Home," Pedagogical Seminary and Journal of Genetic Psychology, 42:236-242, 1933.

22. Lorimer, Frank and Osborn, Frederick. Dynamics of Population. New York: The Macmillan Company, 1934.

23. Maller, J. B. "Economic and Social Correlatives of School Progress in New York City," Teachers College Record, 34:655-670, May 1933.

24. McWilliams, Carey. Small Farm and Big Farm. Public Affairs Pamphlet No. 100. New York: Public Affairs Committee, Inc., 1945.

25. Melby, Ernest O. Administering Community Education. Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1955.

26. Morphet, Edgar L. and Others. Education and the Future of Florida. Tallahassee, Florida: Florida Citizens Committee, 1947.

27. Mort, Paul R. and Cornell, Francis G. American Schools in Transition. New York: Bureau of Publications, Teachers College, Columbia University, 1941.

28. Neff, W. S. "Socio-Economic Status and Intelligence: A Critical Survey," Psychological Bulletin, 35:727-757, 1938.

29. Newman, H. H., Freeman, F. N., and Holzinger, K. J. Twins: A Study of Heredity and Environment. Chicago: University of Chicago Press, 1937.

30. North, Robert D. "The Intelligence of American Negroes," Research Reports, Vol. 3, No. 2. New York: Anti-Defamation League of B'nai B'rith, November 1956.

31. Pierce, Truman Mitchell. Controllable Community Characteristics Related to the Quality of Education. New York: Bureau of Publications, Teachers College, Columbia University, 1947.

32. Pierce, Truman Mitchell and Others. White and Negro Schools in the South: An Analysis of Biracial Education. Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1955.

33. Reeves, Floyd. Excerpt from testimony before the Committee on Education and Labor, United States Senate, Seventy-Ninth Congress, Part 2, Federal Aid for Education. Washington, D. C.: Government Printing Office, 1945.

34. Reymert, M. L. and Hinton, R. T. "The Effect of a Change to a Relatively Superior Environment upon the IQ's of One Hundred Children," The Thirty-Ninth Yearbook of the National Society for the Study of Education. Intelligence: Its Nature and Nurture. Part II. Original Studies and Experiments. Bloomington, Illinois: Public School Publishing Company, 1940.

35. Sherman, Mandel and Key, Cora B. "The Intelligence of Isolated Mountain Children," Child Development, 3:279-290, 1932.

36. Shuey, Audrey M. The Testing of Negro Intelligence. Lynchburg, Virginia: J. P. Bell Company, Inc., 1958.

37. Skeels, Harold M. and Others. "A Study of Environmental Stimulation: An Orphanage Preschool Project," University of Iowa Studies in Child Welfare, Vol. 15, No. 4. Iowa City, Iowa, 1938.

38. Stoddard, George D. The Meaning of Intelligence. New York: The Macmillan Company, 1949.

39. Terman, Lewis M. Introduction to The Twenty-Seventh Yearbook of the National Society for the Study of Education. Nature and Nurture. Part I. Their Influence Upon Intelligence. Bloomington, Illinois: Public School Publishing Company, 1928.

40. Terman, Lewis M. and Merrill, M. A. Measuring Intelligence: A Guide to the Administration of the New Revised Stanford-Binet Tests of Intelligence. Boston, Massachusetts: Houghton-Mifflin, 1937.

41. Thorndike, E. L. Your City. New York: Harcourt, Brace and Company, 1939.

42. Thorndike, E. L. and Woodyard, Ella. "The Relationship between the Aesthetic Status of a Community and Its Status in Other Respects," American Journal of Sociology, 49:59, July 1943.

43. Vincent, William S. Emerging Patterns of Public School Practice. New York: Bureau of Publications, Teachers College, Columbia University, 1945.

44. Warner, William Lloyd, Havighurst, Robert J., and Loeb, Martin B. Who Shall Be Educated? The Challenge of Unequal Opportunities. New York: Harper and Brothers, 1944.

45. Warner, William Lloyd and Havighurst, Robert J. Should You Go to College? Chicago: Science Research Associates, Inc., 1948.

46. Warner, William Lloyd and Lunt, Paul S. The Social Life of a Modern Community. New Haven: Yale University Press, 1941.

47. Warner, William Lloyd, Meeker, Marchia, and Eells, Kenneth. Social Class in America. Chicago: Science Research Associates, Inc. 1949.

48. Wellman, Beth L. "Mental Growth from Preschool to College," Journal of Experimental Education, 6:127-138, 1937-1938.

49. Yerkes, R. M. (ed.). Psychological Examining in the United States Army, Memoirs of the National Academy of Sciences. Washington, D. C.: Government Printing Office, 1921.

50. Yoakum, Clarence S. and Yerkes, Robert M. Army Mental Tests. New York: Henry Holt and Company, Inc., 1920.

CHAPTER III

ORGANIZATION OF THE STUDY

It is the purpose in this chapter to present an explanation of the procedures which were used in the collection and organization of the basic data involved in the study. The unit selected for use as a "case" was the county.[1] This unit is the local school administrative unit in the state of Florida and is therefore of basic interest.

This study deals with measures of socio-economic status, intelligence, and academic achievement for each county. Census data relating to adult schooling and family income were used to derive measures of the socio-economic level of the white, nonwhite, and total population of each county. Census data concerning the size of counties (per cent of state population) and the composition of the population within counties provided additional demographic information needed in the study. The measures of median intelligence and median academic achievement were calculated from the individual test scores made by those high school seniors who participated in the Florida State-Wide

[1] A discussion of considerations regarding the county as the observational unit is given in Hagood and Price (9, pp. 354-355) and in Ducoff and Hagood (4, pp. 78-84).

Twelfth-Grade Testing Program during the years 1955 through 1957.* Details of the development and validation of these various measures are described in detail in this chapter.

Development of County-Wide Measures of Socio-Economic Levels

In the preceding chapter evidence was presented to show the influence of environmental factors on the intelligence and achievement of children. While it is difficult to unravel these specific influences, the literature is replete with investigations which indicate that the expression, "As the community, so the teacher and so the school," describes aptly the relationship between the socio-economic level of the people of a community and the educational quality of its schools (14, p. 413). In making an analysis of controllable characteristics related to the quality of education, Pierce found a high degree of association between the quality of a community and the adaptability of its schools. As Pierce stated it: "Good schools are likely to be found in good communities and less desirable communities are likely to have poorer schools" (17, p. 12). It would appear, then, that a so-called "good community" would be characterized by a high socio-economic level. The similarity is indicated by the fact that two of the controllable community factors used by Pierce are in the socio-economic measures of the present study.

---

*Since the tests administered in 1955 represented merely a different form of the identical tests which were administered in 1956 and 1957, it seemed reasonable to assume that these test results could be combined, thereby yielding more representative results for the counties involved. The test results for 1955 were used principally to increase the number of participants within certain counties to a minimum of fifty.

Socio-economic levels of schooling, income, and occupation

Mort and Vincent, who have made numerous studies in an effort to determine specific ways in which communities can improve their schools, have advanced the view that:

> ...schools tend to be better in communities where the general educational level of the population is high; where occupations run toward the professions, the white-collar job, and the highly skilled trades, with few unskilled workers in the population (15, pp. 89-90)

In studying the tax-paying ability of local communities, Johns recognized the fact that differences in communities went beyond the variations in tax effort among local schools with essentially the same per pupil wealth. He hypothesized that "these differences...might be explained by differences in the cultural level of the people or by... the quality of educational leadership" (10, p. 236).

Well-documented, nation-wide studies by the United States Chamber of Commerce (21) and by Newton Edwards (7) have revealed a direct relationship between level of education and income in various states. Since this study deals expressly with the counties of Florida as unit cases, involving as it does the county-wide school systems of Florida and their community backgrounds, it is appropriate to re-emphasize that the Florida Citizens Committee on Education, after completing one of the most extensive and effective studies ever to be undertaken in the field of education in the state, concluded that there were tremendous variations in the median academic standing in representative Florida counties and indicated that these differences appeared to be related to differences in the median school expenditure of the counties involved (13).

While aspects of income and schooling levels have been used as single indexes of socio-economic status, perhaps the most frequently employed single index of socio-economic status or level is one based on an occupational classification. A system of classifying occupations which is used extensively is the one developed by Alba Edwards (5) and employed by the United States Bureau of the Census. The major criterion of the Edwards' classification of occupations is the cultural, esthetic, and social prestige of the occupation. Numerous investigators[1] have used the Edwards' classification of occupations as a type of Socio-Economic Conversion Scale through the ranking of occupations on a six-point occupational continuum: one representing professional, two representing semi-professional, three representing clerical, four representing skilled laborers, five representing semi-skilled laborers, and six representing the unskilled and the unemployed.

Various researchers (8, 11, 18, 22) have employed a number of factors as single measures of socio-economic status or level. Since the factors of income, schooling, and occupation have been used widely as single measures of socio-economic status, it was decided to utilize all three of these factors in the development of a more representative socio-economic index for each county. It was hoped that a composite socio-economic index could be developed in terms of the three separate socio-economic factors for the white, nonwhite, and the total population in each county.

---

[1]See studies by King (11), Smith (18), and Wilson (22).

It was felt that the individual measures of schooling, income, and occupation (see definitions in chapter II), when computed, would reveal a significant correlation with each other. Special worksheets were prepared and the pertinent facts, derived from 1950 Census data,[1] were collected and tabulated for each factor on a county-wide basis for the sixty-seven counties represented in the study.

Appendix A contains copies of the special worksheets which were used in the development of the socio-economic measures for each county. The occupational worksheet reveals the procedure which was used in combining twelve major occupations into the six special occupational categories employed by Edwards in his classification of occupations. Once the white and nonwhite occupational categories were determined, it was possible to obtain the measure for the total population by simply adding the groups in their respective categories. The medians were computed separately for the white, nonwhite, and total population in each county.

In ascertaining the level of schooling for the adults in each county, a worksheet (see Appendix A) was patterned on the order of the presentation of the statistical information on schooling in the 1950 Census (20, pp. 93-96, 106-109). This worksheet makes provision for the number of persons who completed specific grade levels. The worksheet expresses these grade levels in terms of a continuous series of numbers, from no school years completed at all to 16 or more years of school

---

[1]For data on occupations, see 1950 Census of Population (20, pp. 97-100); data on adult schooling (20, pp. 93-96, 106-109); and data on family income (20, pp. 110-112).

completed. Medians were computed separately for the three frequency distributions on level of schooling for those persons twenty-five years old and over in each county represented in the study.

The median annual income for families (see definitions in chapter II) was available in the 1950 Census data (20, pp. 110-112) for the general population and for the nonwhite population of each Florida county. In determining the median annual income for the white population only, however, it was necessary to devise a special work-sheet (see Appendix A) and to employ the following procedures:

Step One: Subtract the number of families not reporting income from the total number of families for the general population; subtract the number of families not reporting income from the total number of families for the nonwhite population; then, to get the total number of white families, subtract the new total for the nonwhite families from the new total for the general population. This provides the new total number of families for whites only.

Step Two: Divide the new total number of white families (Step One) by 2. This provides the half-way point in the number of families of the white population.

Step Three: Locate the class interval in which this half-way point lies.

Step Four: Subtract the number of families below the mid-point interval from the results obtained in Step Two.

Step Five: Divide the results obtained in Step Four by the number of families in the mid-point interval.

Step Six: Multiply the quotient derived from Step Five by the range of the mid-point interval (in dollars).

Step Seven: Add the amount obtained in Step Six to the lowest limit of the mid-point interval (in dollars). This provides the county-wide median family income for whites only.

Normalizing the Socio-Economic Raw-Score Distributions

Once the socio-economic levels of schooling, income and occupation had been determined for each county in terms of their raw scores, it became necessary to transform the raw scores of each measure for whites, nonwhites, and the total population into equivalent points in a normal distribution. By making the mean 50 and the standard deviation 10 in each one of these measures of socio-economic status or level, all the raw scores were converted into T-values by following standard computational procedures (6, pp. 108-113).

Correlation between Socio-Economic Levels of Schooling, Income, and Occupation

Once the basic data needed for this study had been collected, special IBM processing sheets were completed in connection with the transfer of these basic data to standard IBM cards. From this point on, the facilities of the Statistical Laboratory at the University were used in the majority of the computations which were made during the study. This was done primarily to insure accuracy.

It was hypothesized that the individual measures of socio-economic levels would reveal a significant correlation with each other.

When Pearson r's were computed for the measures of schooling, income, and occupation, the results were as follows:

For whites (N = 67)

Schooling and Occupation	.07
Schooling and Income	.66
Occupation and Income	-.19

For whites (N = 50)

Schooling and Occupation	.15
Schooling and Income	.62
Occupation and Income	-.02

For nonwhites (N = 67)

Schooling and Occupation	.23
Schooling and Income	.55
Occupation and Income	-.14

For nonwhites (N = 50)

Schooling and Occupation	.04
Schooling and Income	.60
Occupation and Income	.33

For the total population (N = 67)

Schooling and Occupation	.40
Schooling and Income	.73
Occupation and Income	.06

For the total population (N = 50)

Schooling and Occupation	.47
Schooling and Income	.76
Occupation and Income	.27

The previously cited correlations indicate that the occupational measure does not conform to common expectations or notions of it. The occupational measure was included in the study originally to give a broader coverage in the socio-economic index. With a single exception,

the correlations between occupation and the two other measures, schooling and income, were consistently low or negative. For this reason, it was decided to eliminate the occupational measure from this study,[1] employing only the two measures of schooling and income (and their combination) as the index of socio-economic status for each county.

---

[1]While numerous studies have employed successfully the Edwards' classification of occupations, many of these studies (11, 18, 22) were conducted in single communities, counties, or areas of great homogeneity of occupational groups. In venturing an explanation for the failure of the occupational measure in this study, the writer would stress the extreme heterogeneity of the occupational groups throughout the state of Florida, particularly the variations from county to couty which are to be found among the group classified as farmers many of whom are retired.

TABLE 2

MEDIAN YEARS OF SCHOOLING AND MEDIAN ANNUAL INCOME
OF WHITE FAMILIES IN FLORIDA COUNTIES

Index Values: 50 = average for Florida on White Population

County Number	Level of Schooling		Level of Income		Total Index Value (STW)
	Median Years	Index Value (S_{1W})	Median Amount	Index Value (S_{2W})	
1	12.2	75	$ 1,420	42	117
2	10.7	60	2,549	61	121
3	8.4	51	1,684	47	98
4	11.2	66	2,795	65	131
5	11.9	70	2,806	66	136
6	7.6	43	1,145	34	77
7	8.3	50	1,580	46	96
8	9.4	56	1,490	43	99
9	8.3	50	2,098	53	103
10	11.2	66	1,790	64	130
11	10.1	59	2,935	70	129
12	8.7	52	2,585	62	114
13	7.4	41	1,635	46	87
14	8.1	48	1,160	55	103
15	7.1	37	1,499	44	81
16	10.3	60	2,255	57	117
17	9.0	53	2,265	58	111
18	9.4	56	2,095	53	109
19	7.1	37	1,315	38	75

The counties in this list are not in alphabetical order.

TABLE 2--Continued

County Number	Level of Schooling		Level of Income		Total Index Value (S_{TW})
	Median Years	Index Value (S_{1W})	Median Amount	Index Value (S_{2W})	
20	7.8	45	$ 1,760	49	94
21	9.8	57	1,930	51	108
22	9.7	57	2,029	53	110
23	11.2	66	2,130	54	120
24	8.3	50	1,335	39	89
25	7.6	43	1,360	39	82
26	9.4	56	1,848	49	105
27	9.3	55	2,170	56	111
28	9.3	55	1,990	52	107
29	10.0	58	1,850	50	108
30	7.8	45	2,255	57	102
31	8.8	52	1,450	42	94
32	10.8	61	2,398	60	121
33	8.2	48	1,470	43	91
34	11.0	63	2,455	61	124
35	7.9	47	1,700	48	95
36	10.9	62	2,131	55	117
37	8.7	52	3,215	75	127
38	9.0	53	2,170	56	109
39	9.2	54	2,215	56	110

TABLE 2--Continued

County Number	Level of Schooling		Level of Income		Total Index Value (S_{TW})
	Median Years	Index Value (S_{1W})	Median Amount	Index Value (S_{2W})	
40	9.7	57	$ 2,648	63	120
41	7.8	45	1,490	43	88
42	11.1	64	2,300	59	123
43	9.9	58	2,115	54	112
44	7.8	45	1,880	51	96
45	7.5	42	1,365	40	82
46	7.2	40	1,685	47	87
47	10.8	61	2,026	52	113
48	7.2	40	1,375	40	80
49	7.1	37	1,310	37	74
50	6.7	32	1,145	34	66
51	7.8	45	1,543	45	90
52	8.1	48	1,499	44	92
53	8.3	50	2,255	57	107
54	7.9	47	1,975	52	99
55	6.8	34	1,405	41	75
56	8.0	47	1,710	48	95
57	7.1	37	1,112	32	69
58	8.3	50	1,875	50	100
59	7.7	44	2,325	60	104
60	7.5	42	1,546	45	87

TABLE 2--Continued

County Number	Level of Schooling		Level of Income		Total Index Value (S_{TW})
	Median Years	Index Value (S_{1W})	Median Amount	Index Value (S_{2W})	
61	8.9	53	$ 2,880	68	121
62	8.3	50	1,695	48	98
63	5.9	25	960	30	55
64	7.2	40	875	25	65
65	6.6	30	1,198	36	66
66	7.8	45	1,640	47	92
67	7.2	40	1,850	50	90

TABLE 3

MEDIAN YEARS OF SCHOOLING AND MEDIAN ANNUAL INCOME
OF NONWHITE FAMILIES IN FLORIDA COUNTIES

Index Values: 50 = average for Florida on Nonwhite Population

County Number	Level of Schooling		Level of Income		Total Index Value (S_{TN})
	Median Years	Index Value (S_{1N})	Median Amount	Index Value (S_{2N})	
1	5.2	50	$ 1,068	54	104
2	5.6	56	1,256	61	117
3	5.2	50	771	39	89
4	5.7	58	1,134	56	114
5	5.5	54	1,156	58	112
6	5.0	47	700	35	82
7	5.8	60	1,013	52	112
8	5.1	48	986	52	100
9	5.1	47	871	44	91
10	6.5	68	1,567	70	138
11	6.6	70	1,313	64	134
12	6.2	63	1,254	60	123
13	4.4	44	847	44	88
14	4.1	42	879	45	87
15	3.4	34	961	49	83
16	5.2	50	949	48	98
17	6.2	63	1,235	60	123

The counties in this list are not in alphabetical order.

TABLE 3--Continued

County Number	Level of Schooling		Level of Income		Total Index Value (S_{TN})
	Median Years	Index Value (S_{1N})	Median Amount	Index Value (S_{2N})	
18	5.2	50	$ 1,276	61	111
19	4.2	43	772	40	83
20	3.8	37	655	30	67
21	5.6	56	1,155	57	113
22	5.5	54	841	43	97
23	5.4	53	879	45	98
24	4.2	43	1,050	53	96
25	3.9	40	900	46	86
26	5.3	52	965	50	102
27	5.5	54	869	44	98
28	5.1	48	1,053	53	101
29	6.8	75	1,285	65	140
30	5.7	58	1,431	66	124
31	6.2	63	936	47	110
32	6.2	63	1,139	57	120
33	5.5	54	821	42	96
34	5.7	58	1,107	56	114
35	5.3	52	1,162	58	110
36	6.2	63	1,290	63	126
37	5.6	56	1,286	62	118
38	5.2	50	995	52	102
39	6.1	60	1,060	54	114

TABLE 3--Continued

County Number	Level of Schooling		Level of Income		Total Index Value (S_{TN})
	Median Years	Index Value (S_{1N})	Median Amount	Index Value (S_{2N})	
40	5.3	52	$ 1,117	56	108
41	4.4	44	725	36	80
42	6.2	63	1,096	55	118
43	5.1	48	980	51	99
44	5.6	56	884	46	102
45	4.8	46	786	41	87
46	3.5	36	1,079	55	91
47	6.4	66	964	50	116
48	3.9	40	905	47	87
49	5.7	58	823	43	101
50	4.5	45	683	34	79
51	3.8	37	908	47	84
52	3.9	40	975	51	91
53	3.9	40	1,204	59	99
54	5.2	50	959	49	99
55	2.9	30	975	51	81
56	3.9	40	945	48	88
57	4.2	43	667	32	75
58	4.4	44	940	48	92
59	4.9	47	1,000	52	99
60	5.3	52	780	40	92

TABLE 3--Continued

County Number	Level of Schooling		Level of Income		Total Index Value (S_{TN})
	Median Years	Index Value (S_{1N})	Median Amount	Index Value (S_{2N})	
61	4.6	46	$ 1,571	75	121
62	5.6	56	1,535	68	124
63	4.9	47	810	42	89
64	3.1	32	563	25	57
65	2.3	25	737	38	63
66	3.5	36	729	37	73
67	4.1	42	762	39	81

TABLE 4

MEDIAN YEARS OF SCHOOLING AND MEDIAN ANNUAL FAMILY INCOME OF THE TOTAL POPULATION IN FLORIDA COUNTIES

Index Values: 50 = average for Florida for Total Population

County Number	Level of Schooling		Level of Income		Total Index Value (S_{TP})
	Median Years	Index Value (S_{1P})	Median Amount	Index Value (S_{2P})	
1	9.0	62	$ 1,310	46	108
2	8.2	56	2,238	67	123
3	7.0	46	1,373	47	93
4	8.8	60	1,724	56	116
5	9.5	64	2,306	69	133
6	6.2	42	1,050	38	80
7	7.6	50	1,380	47	97
8	8.2	56	1,423	48	104
9	7.1	47	1,587	52	99
10	10.2	68	2,500	75	143
11	8.8	60	2,306	69	129
12	8.0	55	2,154	65	120
13	6.4	43	1,306	45	88
14	5.9	39	1,238	43	82
15	4.4	25	1,204	42	67
16	7.9	54	1,792	58	112
17	8.3	57	2,011	61	118
18	7.8	53	1,788	57	110

The counties in this list are not in alphabetical order.

TABLE 4--Continued

County Number	Level of Schooling		Level of Income		Total Index Value (S_{TP})
	Median Years	Index Value (S_{1P})	Median Amount	Index Value (S_{2P})	
19	5.9	39	$ 1,082	39	78
20	4.6	30	880	30	60
21	8.3	57	1,638	54	111
22	8.5	58	1,739	56	114
23	8.7	60	1,433	49	109
24	5.7	34	1,178	41	75
25	5.7	34	1,087	39	73
26	8.3	57	1,540	52	109
27	7.6	50	1,443	50	100
28	7.8	53	1,483	50	103
29	9.3	63	1,778	56	119
30	7.2	48	1,891	59	107
31	8.6	59	1,601	53	112
32	9.8	67	2,038	62	129
33	7.9	54	1,327	46	100
34	8.9	61	1,814	58	119
35	7.7	51	1,570	52	103
36	10.3	70	1,990	60	130
37	7.8	53	2,051	64	117
38	7.4	49	1,491	50	99
39	7.9	54	1,635	53	107

TABLE 4--Continued

County Number	Level of Schooling		Level of Income		Total Index Value (S_{TP})
	Median Years	Index Value (S_{1P})	Median Amount	Index Value (S_{2P})	
40	8.0	55	$ 2,008	60	115
41	7.6	50	1,403	48	98
42	10.4	75	2,038	62	137
43	7.9	54	1,392	48	102
44	7.4	49	1,446	50	99
45	6.9	45	1,126	40	85
46	5.8	37	1,356	47	84
47	9.6	65	1,665	55	120
48	6.1	41	1,239	44	85
49	6.8	45	1,133	41	86
50	6.2	42	1,023	36	78
51	5.8	37	1,307	45	82
52	7.7	51	1,436	49	100
53	7.0	46	1,637	54	100
54	7.5	49	1,671	55	104
55	6.2	42	1,299	44	86
56	6.1	41	1,217	43	84
57	6.7	44	953	34	78
58	6.7	44	1,188	42	86
59	6.7	44	1,780	57	101
60	7.1	47	1,510	51	98

TABLE 4--Continued

County Number	Level of Schooling		Level of Income		Total Index Value (S_{TP})
	Median Years	Index Value (S_{1P})	Median Amount	Index Value (S_{2P})	
61	7.7	51	$ 2,045	63	114
62	7.7	51	1,655	54	105
63	5.9	39	950	32	71
64	7.0	46	850	25	71
65	6.1	41	995	35	76
66	7.0	46	1,269	44	90
67	5.7	34	1,034	37	71

Tables 2, 3, and 4 present the socio-economic measures of schooling and income in terms of their raw scores and normalized T-values for each county represented in the study.

The Development of County-Wide Measures of Intelligence and Academic Achievement Levels

As has been stated in Chapter II, many influences combine to form the sum total of forces acting upon a school system, particularly a county-wide school system. Any attempt to unravel these influences in an effort to determine the educational quality of a particular school system is complicated by the fact that communities within counties vary widely in terms of specific measures by which they may be gauged (17, p. 6).

While the educational quality of a school system includes more than the thorough teaching of subject matter, there can be little doubt that the level of mastery of the fundamental subjects--English, social studies, natural sciences, and mathematics--on the part of the graduating seniors in a particular county-wide school system is a rather reliabile indicant of the quality of a school's educational program. The Report of the Commission on Reorganization of Secondary Education of the National Education Association termed this objective as "the command of the fundamental processes" (16, p. 40). The Florida Citizens Committee, recognizing the importance of subject matter mastery, specifically recommended that constant attention should be given to the

so-called "three R's" (13, p. 88). Stating the case for subject matter mastery more succinctly, the Cooperative Study group reported, among other things, that:

> Regardless of varying objectives and curricula there is a large body of instructional material which should be common to nearly all, if not all educational students. This portion of the instructional program is better adapted to standardized testing than the portion which varies more widely from school to school (2, p. 162).

Florida Statewide Twelfth-Grade Testing Program

The current Florida Twelfth-Grade Testing Program had its inception over twenty years ago. Throughout its history, participation in the program on the part of Florida seniors in public and private high schools of the state has been voluntary. In recent years virtually all white Florida high school seniors have taken the State-Wide Twelfth-Grade Testing Program Battery a short time prior to being graduated. While participation on the part of nonwhite Florida high school seniors in the State-Wide Testing Program has increased steadily since 1948, this degree of participation has not as yet approached the high per cent of seniors found taking the tests in the white high schools of the state.

TABLE 5

NUMBER OF SENIORS TESTED IN THE FLORIDA STATE-WIDE TWELFTH-GRADE TESTING PROGRAM SINCE ITS INCEPTION*

Year	White	Nonwhite	Total
1939	9,049	. . . .	9,049
1940	9,333	. . . .	9,333
1941	10,057	. . . .	10,057
1942	9,973	. . . .	9,973
1943	8,207	. . . .	8,207
1944	8,783	. . . .	8,783
1945	9,052	. . . .	9,052
1946	10,656	. . . .	10,656
1947	12,057	. . . .	12,057
1948	12,001	469	12,470
1949	13,165	1,821	14,986
1950	13,500	2,254	15,844
1951	13,580	1,988	15,568
1952	14,568	2,250	16,818
1953	16,173	2,571	18,744
1954	17,222	2,840	20,062
1955	18,677	3,342	22,019
1956	21,400	4,098	25,498
1957	23,177	4,423	27,600
1958			

*Records in the office of the University Examiner, Dr. John V. McQuitty, University of Florida, Board of University Examiners, Seagle Building, Gainesville, Florida.

Table 5 reveals that the number of high-school seniors tested each year, beginning with the year 1939,* has risen steadily, particularly since the close of World War II. In this particular study the Florida

*The program was actually started a few years previously, but complete records are not available prior to 1939.

State-Wide Twelfth-Grade Testing Battery[1] consisted of the five tests which follow:

1. The American Council on Education Psychological Examination, High School Edition.
2. The Cooperative English Test, Effectiveness of Expression, High School Edition.
3. The Cooperative General Achievement Tests: Part I, Social Studies, High School Edition.
4. The Cooperative General Achievement Tests: Part II, Natural Sciences, High School Edition.
5. The Cooperative General Achievement Tests: Part III, Mathematics, High School Edition.

Intelligence and Academic Achievement Levels

The test battery listed previously constitutes the basis for determining the intelligence and academic achievement levels of the high school seniors in the counties represented in this study. The original raw scores of each high school senior on the five tests comprising the State-Wide Twelfth-Grade Testing Program Battery were grouped within each county. Frequency distributions of these raw scores were developed for each of the five test areas: psychology (intelligence), English, social studies, natural science, and mathematics. Special worksheets were prepared which greatly facilitated the tabulations and the computations of the median raw scores in the respective areas for each county. More than 120,000 test scores made

[1]Battery Form Y was used during the school year 1954-1955, whereas Battery Form Z was used during the school years 1955-1956 and 1956-1957. The scores on the different forms are comparable. These tests are described in Dobbin (4).

by 24,125 seniors were tabulated in terms of frequency distributions for the white, nonwhite, and total high school senior population. These tabulation sheets, although not exhibited here, have been retained on file, and it is believed that virtually all public school personnel, particularly those people currently employed in the public schools of Florida, would find these worksheets a fruitful source of information for further study and research in attacking many of the pressing problems facing Florida's county-wide school systems today.

The Development of a Set of Equivalent-Score Data

To avoid giving undue weight to the different tests involving aspects of academic achievement, all original raw test scores were converted to comparable scaled scores. Based on national data, scaled scores provide an equivalent-unit scale and permit the combining of test results with equal weight. These scaled scores are supplied by the test publishers. Once the original raw scores had been converted to comparable scaled scores, it was possible to add the four-test scores together, thereby creating an over-all total academic achievement scaled score for each county involved in the study.

Since there were no publisher's scaled scores for the psychology (intelligence) portion of the test battery, it became necessary to develop a set of equivalent-score data so that the county median score would be in terms comparable to the other tests. This equating was accomplished by several steps. First, the mean and standard deviation of the four-subject achievement test total (in scaled scores) were calculated for each of the counties of Florida. The original raw scores

of the intelligence test were then expressed as deviations from the national norm and given the same standard deviation as the Florida achievement test scores.

The following formulae were used in the calculations necessary to obtain intelligence scores in a form comparable to the achievement test scores:

$$z = \frac{X - \frac{\bar{X}}{2}}{\frac{SD_1}{2}} \qquad R = \frac{SD_a}{SD_z}$$

$$\text{Scaled intelligence score} = (R)(z) + M$$

In these formulae[1] the symbol X denotes the Florida county-wide median intelligence score; $\bar{X}$ denotes the national mean; and SD in this equation denotes the national standard deviation. The value of z given by this equation expresses a Florida score as a national z-score. In order to make these intelligence scores more fully comparable to the Florida achievement scores, the intelligence scores were adjusted by the second equation to obtain a standard deviation (variability) equal to that of the achievement scores in Florida. This was accomplished by multiplying the z-scores by the ratio of the standard deviation of the Florida achievement scores[2] to the standard deviation of the calculated z-scores.

---

[1]These formulae are generally used for calculating "standard scores" or z-values. The only special feature here is that the Florida intelligence scores were originally recorded as half their value to keep the scores to two digits. Hence, in the formula, $\frac{\bar{X}}{2}$ and $\frac{SD}{2}$ are substituted for the usual $\bar{X}$ and SD.

[2]The standard deviation of the Florida achievement scores was taken as the average of the standard deviations of the four achievement tests.

These deviation intelligence scores were then transformed to a scale position comparable to the achievement tests by adding the national test mean of 50. The resulting intelligence score for any county would then deviate from the national average in terms comparable to the achievement test scores.

Tables 6, 7, and 8 present the intelligence measures and academic achievement measures in terms of their normalized "scaled scores."

TABLE 6

COUNTY-WIDE MEDIAN TEST SCORES, BY SUBJECTS,
HIGH SCHOOL SENIORS: WHITE

Florida State-Wide Twelfth-Grade Testing Program, 1956 and 1957. Numbers are "scaled scores" determined from national norms; 50 represents average.

County Number	Intelligence (Y_{1W})	English (Y_{2W})	Social Studies (Y_{3W})	Natural Science (Y_{4W})	Mathematics (Y_{5W})	Total (excluding Intelligence) (Y_{TW})
1	48	44	49	55	51	199
2	45	44	49	54	50	197
3	46	44	49	55	52	200
4	48	46	50	55	51	202
5	50	49	52	56	51	208
6	45	42	46	55	49	192
7	47	37	47	55	50	189
8	47	40	49	55	49	193
9	45	44	47	53	50	194
10	49	49	53	56	51	209
11	50	48	52	55	52	207
12	47	45	50	56	50	201
13	45	42	44	54	49	189
14	48	47	52	54	51	204
15	44	37	44	52	50	183
16	44	44	47	53	48	192
17	47	46	51	55	51	203
18	47	49	52	55	51	207

TABLE 6--Continued

County Number	Intelligence (Y_{1W})	English (Y_{2W})	Social Studies (Y_{3W})	Natural Science (Y_{4W})	Mathematics (Y_{5W})	Total (excluding Intelligence) (Y_{TW})
19	44	39	46	51	48	184
20	45	43	48	53	50	194
21	49	47	52	56	52	207
22	47	49	50	54	50	203
23	48	51	54	56	52	213
24	46	42	47	53	50	192
25	44	42	49	53	50	194
26	48	58	52	55	51	206
27	47	43	47	55	51	196
28	51	45	52	55	49	201
29	48	44	49	55	49	197
30	44	43	49	52	48	192
31	45	40	45	52	48	185
32	49	48	52	56	51	207
33	45	42	51	54	50	197
34	48	47	52	56	51	206
35	47	44	49	53	50	196
36	52	48	54	57	52	211
37	48	47	52	55	51	205
38	46	46	51	54	51	202
39	47	42	50	54	52	198

TABLE 6--Continued

County Number	Intelligence (Y_{1W})	English (Y_{2W})	Social Studies (Y_{3W})	Natural Science (Y_{4W})	Mathematics (Y_{5W})	Total (excluding Intelligence) (Y_{TW})
40	50	50	52	57	51	210
41	46	43	46	55	47	191
42	48	46	50	56	50	202
43	47	47	52	56	52	207
44	45	43	47	55	48	193
45	44	39	45	52	49	185
46	45	40	47	54	47	188
47	49	49	52	57	52	200
48	42	39	43	51	47	180
49	43	41	51	52	50	195
50	45	40	46	52	50	188
51	43	37	43	50	51	181
52	49	47	52	57	49	205
53	46	43	51	55	49	198
54	47	46	52	56	50	204
55	46	42	47	51	50	190
56	45	43	50	53	50	196
57	41	37	42	53	48	180
58	46	45	44	53	49	191
59	43	43	49	53	51	196
60	46	45	49	56	50	200

TABLE 6--Continued

County Number	Intelligence (Y_{1W})	English (Y_{2W})	Social Studies (Y_{3W})	Natural Science (Y_{4W})	Mathematics (Y_{5W})	Total (excluding Intelligence) (Y_{TW})
61	49	43	52	57	51	203
62	48	41	52	53	49	195
63	44	39	44	52	48	183
64	46	44	47	54	51	196
65	44	37	43	53	50	183
66	41	40	44	52	46	182
67	45	39	42	50	49	180

TABLE 7

COUNTY-WIDE MEDIAN TEST SCORES, BY SUBJECTS,
HIGH SCHOOL SENIORS: NONWHITE

Florida State-Wide Twelfth-Grade Testing Program, 1956 and 1957. Numbers are "scaled scores" determined from national norms; 50 represents average.

County Number	Intelligence (Y_{1N})	English (Y_{2N})	Social Studies (Y_{3N})	Natural Science (Y_{4N})	Mathematics (Y_{5N})	Total (excluding Intelligence) (Y_{TN})
1	38	28	37	48	45	158
2	37	31	37	49	45	162
3	37	27	33	46	45	151
4	38	33	36	46	45	160
5	39	35	42	52	47	176
6	37	31	37	46	45	159
7	40	30	36	47	45	158
8	36	26	37	47	45	155
9	35	23	35	48	45	151
10	42	34	41	51	45	171
11	38	33	38	49	45	165
12	37	30	37	48	45	160
13	37	32	39	51	45	167
14	41	35	40	51	45	171
15	36	35	35	48	45	163
16	37	32	36	48	45	161
17	39	32	38	49	45	164
18	41	31	39	49	45	164

TABLE 7--Continued

County Number	Intelligence (Y_{1N})	English (Y_{2N})	Social Studies (Y_{3N})	Natural Science (Y_{4N})	Mathematics (Y_{5N})	Total (excluding Intelligence) (Y_{TN})
19	36	28	35	48	45	156
20	35	26	34	46	44	150
21	37	32	41	52	48	173
22	36	32	38	50	46	166
23	36	31	36	48	45	160
24	36	29	38	46	45	158
25	37	28	34	47	45	154
26	37	29	36	49	45	159
27	37	29	37	48	45	159
28	38	30	39	49	45	163
29	37	29	37	48	45	159
30	40	32	36	49	45	162
31	39	31	37	48	45	161
32	39	32	34	48	45	159
33	37	32	35	49	45	161
34	37	35	38	49	45	167
35	38	32	39	50	45	166
36	40	35	43	51	46	175
37	38	33	37	49	45	164
38	36	34	37	48	45	164
39	38	31	37	48	45	161

TABLE 7--Continued

County Number	Intelligence (Y_{1N})	English (Y_{2N})	Social Studies (Y_{3N})	Natural Science (Y_{4N})	Mathematics (Y_{5N})	Total (excluding Intelligence) (Y_{TN})
40	40	35	42	49	46	172
41	39	29	37	49	45	160
42	44	34	39	50	45	168
43	36	31	38	49	45	163
44	37	27	34	49	45	155
45	29	22	42	50	45	159
46	39	31	36	47	45	159
47	38	32	38	51	45	166
48	36	27	35	47	45	154
49	38	33	37	49	45	164
50	38	29	35	48	45	157

TABLE 8

COUNTY-WIDE MEDIAN TEST SCORES, BY SUBJECTS,
HIGH SCHOOL SENIORS: TOTAL POPULATION

Florida State-Wide Twelfth-Grade Testing Program, 1956 and 1957. Numbers are "scaled scores" determined from national norms; 50 represents average.

County Number	Intelligence (Y_{1P})	English (Y_{2P})	Social Studies (Y_{3P})	Natural Science (Y_{4P})	Mathematics (Y_{5P})	Total (excluding Intelligence) (Y_{TP})
1	45	40	46	44	49	179
2	44	36	47	53	49	185
3	46	40	44	51	49	184
4	46	42	46	52	48	188
5	49	47	51	56	50	204
6	42	37	42	50	47	176
7	44	36	41	49	47	173
8	43	35	48	49	47	179
9	42	38	43	51	48	180
10	48	47	56	56	51	210
11	48	45	49	54	50	198
12	46	42	47	54	49	192
13	41	35	42	52	47	176
14	47	44	49	53	50	196
15	38	36	40	50	47	173
16	41	38	42	51	47	178
17	46	44	49	54	50	197
18	44	42	47	52	49	190
19	42	36	42	50	47	175

TABLE 8--Continued

County Number	Intelligence (Y_{1P})	English (Y_{2P})	Social Studies (Y_{3P})	Natural Science (Y_{4P})	Mathematics (Y_{5P})	Total (excluding Intelligence) (Y_{TP})
20	39	32	39	48	45	164
21	48	44	50	55	51	200
22	45	44	47	53	49	193
23	46	41	47	52	48	188
24	41	37	42	51	47	177
25	41	35	43	54	48	180
26	47	45	50	54	50	199
27	43	38	43	52	48	181
28	45	36	44	52	47	179
29	46	41	47	53	48	189
30	42	37	41	42	48	168
31	44	39	43	52	47	181
32	48	45	51	55	50	201
33	43	39	46	52	48	185
34	47	44	50	55	50	199
35	45	41	47	53	49	190
36	49	47	53	56	51	207
37	47	44	50	54	50	198
38	44	42	47	52	48	189
39	45	41	47	53	49	190

TABLE 8--Continued

County Number	Intelligence (Y_{1P})	English (Y_{2P})	Social Studies (Y_{3P})	Natural Science (Y_{4P})	Mathematics (Y_{5P})	Total (excluding Intelligence) (Y_{TP})
40	48	47	50	55	53	205
41	44	40	42	52	47	181
42	48	38	49	56	50	193
43	45	43	47	53	49	192
44	42	38	43	51	47	179
45	42	37	44	51	48	180
46	43	37	42	51	45	175
47	47	46	50	56	51	203
48	39	34	38	49	45	166
49	42	38	45	52	49	184
50	43	37	42	51	48	178

TABLE 9

PER CENT OF POPULATION IN EACH COUNTY THAT IS NONWHITE AND SIZE OF FLORIDA COUNTIES EXPRESSED AS PER CENT OF TOTAL STATE POPULATION*

County Number	Per Cent of County Population That is Nonwhite (X_N)	Size of County ($X_\%$)	County Number	Per Cent of County Population That is Nonwhite (X_N)	Size of County ($X_\%$)
1	29.0	2.06	21	23.5	1.31
2	16.8	1.54	22	20.1	.84
3	24.4	.41	23	39.5	1.86
4	25.4	.85	24	33.9	.38
5	25.4	3.03	25	45.6	.51
6	14.1	.29	26	22.8	1.25
7	25.4	.22	27	38.2	2.38
8	14.7	.52	28	28.2	.28
9	33.6	.66	29	10.8	1.08
10	13.2	17.86	30	31.3	.46
11	26.9	10.97	31	8.0	.99
12	22.3	4.07	32	19.8	4.15
13	25.7	.21	33	13.1	.41
14	56.1	1.32	34	30.3	4.14
15	42.2	.32	35	13.5	.74
16	25.4	.49	36	11.8	5.75
17	15.3	9.02	37	20.6	4.47
18	24.9	.43	38	36.5	.85
19	33.4	1.25	39	33.3	.90
20	62.5	.38	40	31.7	.73

TABLE 9--Continued

County Number	Per Cent of County Population That is Nonwhite (X_N)	Size of County (X_S)	County Number	Per Cent of County Population That is Nonwhite (X_N)	Size of County (X_S)
41	8.5	.67	55	14.3	.14
42	16.0	1.04	56	45.6	.12
43	44.4	.97	57	9.9	.13
44	26.9	.41	58	40.8	.08
45	29.3	.61	59	26.9	.17
46	30.5	.38	60	7.4	.36
47	22.1	2.68	61	26.1	.22
48	30.9	.19	62	23.0	.24
49	13.3	.53	63	4.4	.50
50	17.8	.43	64	9.4	.12
51	24.5	.23	65	18.3	.11
52	15.7	.15	66	18.6	.12
53	30.6	.23	67	36.3	.32
54	21.7	.33			

*Source: United States Bureau of the Census (22, pp. 93-96, 106-109).

Correlation between Intelligence Levels and Academic Achievement Levels

References were made in Chapter II to Cook (2, p. 1465) and Lorimer and Osborn (14, pp. 113-114) to the relatively high correlations between intelligence-test scores and academic achievement-test scores. In order to determine the relationship between the intelligence levels of Florida counties and their academic achievement levels in each of the four-subject areas and a composite four-subject achievement test total, Pearson r's were computed. The results of these computations were as follows:

White Population (N = 67)*

Intelligence and English.	.73
Intelligence and Social Studies	.76
Intelligence and Natural Science.	.76
Intelligence and Mathematics.	.58
Intelligence and Total Achievement.	.82

Nonwhite Population (N = 50)**

Intelligence and English.	.62
Intelligence and Social Studies	.21
Intelligence and Natural Science.	.26
Intelligence and Mathematics.	.10
Intelligence and Total Achievement.	.47

Total Population (N = 50)***

Intelligence and English.	.86
Intelligence and Social Studies	.88
Intelligence and Natural Science.	.65
Intelligence and Mathematics.	.82
Intelligence and Total Achievement.	.89

---

*See Table 11. These correlations were also computed for whites with an N of 50 (see Table 17). The differences between the r's in Table 11 and Table 17 are not appreciably great.

**See Table 13. ***See Table 14.

The correlations cited in the preceding summary make it abundantly clear that achievement is influenced by a number of factors. In order to remove from the study's data the factor of varying intelligence, the county-wide intelligence level was held constant by statistical techniques. This made possible the proper allowance for the contribution of intelligence-test scores to the determination of the academic achievement level of each county represented in the study.

Basic Data Used in the Study

The scope of this study and the factors investigated are necessarily defined and limited by the data used. Tables 7, 8, and 9 present a list of the basic data used in this study, indicating the various symbols which have been assigned these basic data. The data in Tables 7, 8, and 9 were designed expressly for statistical computations. Below follows a detailed explanation of each symbol used in the study.

The first nine items in Table 10, S_{1W} through S_{TP}, denote a socio-economic index or level for a county. The subscripts accompanying the "S" in the first nine items denote a particular type of frequency distribution in terms of determining the socio-economic index or level for a county: "1W" refers to the level of schooling (see definitions) for the white population of a county, whereas "2W" refers to the income level (see definitions) for the white population of a county. The subscript "TW" denotes a composite[1] of the two traits, schooling (S_{1W}) and income (S_{2W}), computed in T-values, totalled

[1]The term "composite," as used in this study, means a summative value attached to a particular case.

directly, normalized, and weighted equally, having a mean of 100 and a standard deviation of 20, for the white population of a county (see definitions).

TABLE 10

ITEM-CODE OF BASIC DATA USED IN THE STUDY

Item	Description
S_{1W}	= socio-economic factor No. 1: level of adult schooling: White county-wide median.
S_{2W}	= socio-economic factor No. 2: level of family income: White county-wide median.
S_{TW}	= socio-economic composite or total index for white population (combination of S_{1W} and S_{2W}).
S_{1N}	= socio-economic factor No. 1: level of adult schooling: Nonwhite county-wide median.
S_{2N}	= socio-economic factor No. 2: level of family income: Nonwhite county-wide median.
S_{TN}	= socio-economic composite or total index for Nonwhite population (combination of S_{1N} and S_{2N}).
S_{1P}	= socio-economic factor No. 1: level of adult schoolsing for the population of the county.
S_{2P}	= socio-economic factor No. 2: level of family income for the population of the county.
S_{TP}	= socio-economic composite or total index for the population of the county (combination of S_{1P} and S_{2P}).
X_N	= Per cent of county population that is nonwhite.
$X_{\%}$	= Per cent of total state population that is in the county (size of county as per cent of state.
Y_{1W}	= Intelligence test score*: White county-wide median.
Y_{2W}	= English score*: White county-wide median.

*Since test results in the form of raw scores have little meaning, they were converted into scaled scores based on national data supplied by the test publishers. These scaled scores provide an equivalent-unit scale and permit the combining of test results with equal weight.

TABLE 10--Continued

Item	Description
Y_{3W}	= Social Studies score*: White county-wide median.
Y_{4W}	= Natural Science score*: White county-wide median.
Y_{5W}	= Mathematics score*: White county-wide median.
Y_{TW}	= Total score* on four subject tests: White county-wide median (combination of Y_{2W}, Y_{3W}, Y_{4W}, and Y_{5W}).
Y_{1N}	= Intelligence test score*: Nonwhite county-wide median.
Y_{2N}	= English test score*: Nonwhite county-wide median.
Y_{3N}	= Social Studies test score*: Nonwhite county-wide median.
Y_{4N}	= Natural Science test score*: Nonwhite county-wide median.
Y_{5N}	= Mathematics test score*: Nonwhite county-wide median.
Y_{TN}	= Total score* on four subject tests: Nonwhite county-wide median (combination of Y_{2N}, Y_{3N}, Y_{4N}, and Y_{5N}).
Y_{1P}	= Intelligence test score* for the high school seniors of the county: White and nonwhite county-wide median.
Y_{2P}	= English test score* for the high school seniors of the county: White and nonwhite county-wide median.
Y_{3P}	= Social Studies test score* for the high school seniors of the county: White and nonwhite county-wide median.

*Since the test results in the form of raw scores have little meaning, they were converted into scaled scores based on national data supplied by the test publishers. These scaled scores provide an equivalent-unit scale and permit the combining of test results with equal weight.

TABLE 10--Continued

Item	Description
Y_{4P}	= Natural Science test score* for the high school seniors of the county: White and nonwhite county-wide median.
Y_{5P}	= Mathematics test score* for the high school seniors of the county: White and nonwhite county-wide median.
Y_{TP}	= Total score* on four subject tests for the high school seniors of the county: White and nonwhite county-wide median (combination of Y_{2P}, Y_{3P}, Y_{4P}, and Y_{5P}).

*Since the test results in the form of raw scores have little meaning, they were converted into scaled scores based on national data supplied by the test publishers. These scaled scores provide an equivalent-unit scale and permit the combining of test results with equal weight.

The subscripts "1N," "2N," and "TN" denote the nonwhite counterparts of subscripts "1W," "2W," and "TW."

The symbols S_{1P}, S_{2P}, and S_{TP} introduce a particular conceptual scheme for population components. The subscript "1P" denotes the combination of whites and nonwhites (of a county) into a single frequency distribution. From this compound single frequency distribution, a weighted average for the county's total population was derived. This weighted average was then used as the measure of socio-economic factor No. 1 for the combined population of the county. The subscript "1P" therefore denotes the level of adult schooling for the two population components of each county included in the study. Subscript "2P" differs from subscript "1P" only in that it deals with income level, instead of level of schooling, for each county included in the study. The subscript "TP" represents the composite or summative value of "1P" and "2P"; and it also represents the weighted average of S_{TW} and S_{TN}.

Two particular demographic factors are symbolized by X in Table 9. Specifically, the symbol X_N denotes the per cent of the county population that is nonwhite, whereas the symbol $X_{\%}$ represents the per cent of the total state population that is in the county (size of county as per cent of state).

The symbols Y_{1W} through Y_{TP} represent the intelligence levels and the academic achievement levels for the respective population components of the counties included in this study. As has been stated earlier in this chapter, these intelligence levels and academic achievement levels were derived from the test scores made by those participating

Florida high school seniors in the State-Wide Twelfth-Grade Testing Program.

The symbol "Y" has been used to denote the county-wide intelligence levels and academic achievement levels. In the first group of "Y" symbols, Y_{1W} through Y_{TW}, the subscript "1W" denotes the intelligence level (county-wide median scaled score) for the white high school seniors of the county (see definitions), whereas the subscripts "2W," "3W," "4W," and "5W" denote the academic achievement levels (in county-wide median scaled scores) for the white high school seniors of a county in the areas of English (Y_{2W}), social studies (Y_{3W}), natural science (Y_{4W}), and mathematics (Y_{5W}). The final subscript in the first group of "Y" symbols, Y_{TW}, represents the composite or summative value of "2W," "3W," "4W," and "5W."

The subscripts "1N," "2N," "3N," "4N," "5N," and "TN" comprise the second group of "Y" symbols. This group represents the nonwhite counterparts of the first group of "Y" symbols.

The third group of "Y" symbols, Y_{1P} through Y_{TP}, denotes the combination of two population components (white and nonwhite high school seniors of a county) into a single frequency distribution and a derived weighted average for the compound distribution of the high school senior population in a county. Specifically, the subscript "1P" denotes the single composite measure (weighted average) of the intelligence level for the total high school senior population of a county. The subscript "2P" denotes the single composite measure (weighted average) of achievement in English for the total high school senior population of a county. Similarly, the subscript "3P" denotes achievement in

social studies for the total high school senior population of a county; subscript "4P," achievement in natural science for the total high school senior population of a county; and subscript "5P," achievement in mathematics for the total high school senior population of a county. The final subscript in the third group of "Y" symbols, "TP," represents the composite or summative value of "2P," "3P," "4P," and "5P."

Statistical Procedures Employed in the Study

Since the basic questions to be answered in this investigation were formulated in statistical terms, these questions (see pages 11-13), including their counterparts in the form of hypotheses, will be presumed to be answered or tested by the results of appropriate statistical analyses of the basic data used in the study.

The first five questions involve the computation of correlations across the sixty-seven counties of Florida, each county appearing in the correlation table as a unit case, and being represented by its average on each trait involved. Specifically, this means that a county was entered into the correlation table (along with the sixty-six other counties) in terms of (1) its measure of socio-economic status or level, and (2) the county-wide median of the scores made by its high school seniors on the Florida State-Wide Twelfth-Grade Testing Program Battery.

The values of the zero-order coefficients of correlation displayed in Tables 11, 13, 14 and 17 were calculated by use of the Pearson Product-Moment formula.

$$r_{XY} = \frac{N\Sigma XY - \Sigma X \Sigma Y}{\sqrt{\left[N\Sigma X^2 - (\Sigma X)^2\right]\left[N\Sigma Y^2 - (\Sigma Y^2)\right]}}$$

The relative significance of the zero-order correlations displayed in Tables 11, 13, 14, and 17 was determined by consulting specially prepared tables by Snedecor (19, p. 296). These tabled values of r reveal the statistically significant values of r at the 1 per cent and 5 per cent levels. By comparing the values obtained for r with those in Snedecor's table, it is possible to ascertain levels of confidence and regions of acceptance or rejection for specific hypotheses.

In answering questions six, seven, eight, and ten, it was necessary to compute numerous partial correlations and multiple correlations. These computations were determined from the Pearson Product-Moment r's tabulated in Tables 11, 13, 14, and 17 by use of the determinantal conversion formulas:

$$r_{13.2} = \frac{r_{13} - (r_{12})\,(r_{23})}{\sqrt{(1 - r_{12}^2)\,(1 - r_{23}^2)}}$$

$$R_{1(2,3)} = \sqrt{\frac{r_{12}^2 + r_{13}^2 - 2r_{12}r_{23}r_{13}}{1 - r_{23}^2}}$$

Questions nine and eleven involved the computation of numerous partial correlations. Because of the large number of partial r's

needed, the work was done on an IBM 650 Magnetic Drum Electronic Computer. The simple r's were determined through the use of the Pearson Product-Moment formula. Then, given that $(a_{ij})^{-1}$ for i, j = 1, 2,...,n where $(r_{ij})^{-1}$ is the inverse of the matrix of simple correlation coefficients, r_{ij}, the partial correlation coefficients =

1/*

$$r_{1j} \cdot (1j)^1 = \frac{-a_{1j}}{\sqrt{a_{11}\, a_{jj}}}$$

where j = 2, 3,...n.

Since the answer or answers to question twelve involve the findings of the previous eleven basic questions, question twelve will be treated as an interpretive question, the explanation being given in terms of the findings of pertinent related research and the specific findings of this study.

---

*The procedure for determining the inverse matrix, essential in this method, is given in Snedecor (19, pp. 438-443).

Summary

An explanation of the procedures which were used in the collection and organization of the basic data involved in the study has been presented in this chapter. The development and validation of the measures of socio-economic, intelligence, and academic-achievement levels were reported in detail. An explanation was also provided of the process used in normalizing the various distributions in the development of the study's principal measures. Since the study's basic questions were formulated in statistical terms, an item-code of the various symbols assigned to each of the study's basic data was provided in tabular form. Finally, the statistical procedures employed in answering the study's basic questions were explained in a question-by-question fashion.

Bibliography

1. Cook, Walter W. "The Nature of Achievement and Meaning of Its Measurement," The Encyclopedia of Educational Research (Walter S. Monroe, editor). New York: The Macmillan Company, 1950.

2. Cooperative Study of Secondary School Standards. Evaluative Criteria and Educational Temperatures - 1940 Editions. Menasha, Wisconsin: George Banta Publishing Company, 1939.

3. Dobbin, John E. (Director). 1957 Catalog of Cooperative Tests. Princeton, N. J.: Educational Testing Service, Cooperative Test Division, 1957.

4. Ducoff, Louis J. and Hagood, Margaret Jarman. "What Level of Living Indexes Measure," American Sociological Review, 9: 78-84, February 1944.

5. Edwards, Alba M. Comparative Occupational Statistics for the United States: 1870-1940. Washington, D. C.: United States Government Printing Office, 1943.

6. Edwards, Allen L. Statistical Methods for the Behavioral Sciences. New York: Rinehart and Company, Inc., 1954.

7. Edwards, Newton. "Problems of Equality of Opportunity in Education," Review of Educational Research, 16: 46-49, February 1946.

8. Gentry, Gilbert L. "The Relationship of Certain Cultural Factors to Initiative in the Local Support of Education in Florida." Unpublished Ed. D. dissertation, College of Education, University of Florida, 1959.

9. Hagood, Margaret Jarman and Price, Daniel O. Statistics for Sociologists. Revised edition. New York: Henry Holt and Company, 1952.

10. Johns, Roe L., and Others. Problems and Issues in Public School Finance. New York: Bureau of Publications, Teachers College, Columbia University, 1952.

11. King, Maxwell C. "The Relationship between Parental Attitude toward the School and Distance Lived from School, Phase II." Unpublished Ed. D. dissertation, College of Education, University of Florida, 1956.

12. Lorimer, Frank and Osborn, Frederick. Dynamics of Population. New York: The Macmillan Company, 1934.

13. Morphet, Edgar L., and Others. Education and the Future of Florida. Tallahassee, Florida: Florida Citizens Committee, 1947.

14. Mort, Paul R. and Cornell, Francis G. American Schools in Transition. New York: Bureau of Publications, Teachers College, Columbia University, 1941.

15. Mort, Paul R. and Vincent, William S. A Look at Our Schools. New York: Cattell and Company, Inc., 1946.

16. National Education Association, Commission on Reorganizing Secondary Education. Cardinal Principles of Secondary Education. United States Office of Education Bulletin 1918, No. 35. Washington, D. C.: National Education Association, 191[illegible] 1918.

17. Pierce, Truman M. Controllable Community Characteristics Related to the Quality of Education. New York: Bureau of Publication, Teachers College, Columbia University, 1947.

18. Smith, Lawrence E. "The Relationship between Parental Attitude toward the School and Distance Lived from School, Phase I." Unpublished Ed. D. dissertation, College of Education, University of Florida, 1956.

19. Snedecor, George W. Statistical Methods: Applied to Experiments in Agriculture and Biology. Third edition. Ames, Iowa: The Iowa State College Press, 1940.

20. United States Bureau of the Census. Seventeenth Census of the United States: 1950. Population, Volume II Washington, D. C.: United States Government Printing Office, 1952.

21. United States Chamber of Commerce. Education - An Investment in People. Washington, D. C.: A Monograph of the Education Department, Chamber of Commerce of the United States, 1954.

22. Wilson, Bruce. "A Study of the Relationship between Pupil Achievement and the Working Patterns of School Principals." Unpublished Ed. D. dissertation, College of Education, University of Florida, 1955.

CHAPTER IV

ANALYSIS OF THE DATA

A community approach to educational problems has been employed in this particular investigation. Measures characteristic of an entire county as a community, or congeries of communities, are considered in relation to median measures of intelligence and academic achievement of all those high school seniors within each county who participated in the Florida State-Wide Twelfth-Grade Testing Program. This study has been specifically directed toward answering the following basic questions concerning the counties of Florida as unit cases:

1. Is there a relationship between the median socio-economic level of a county and the median academic achievement level of high school seniors in that county?

2. Is there a relationship between the median socio-economic level of a county and the median intelligence level of high school seniors in that county?

3. Is there a relationship between the median intelligence level of a county and the median academic achievement level of high school seniors in that county?

4. Is there a relationship between the per cent of nonwhites in a county and the median academic achievement level of high school seniors in that county?

5. Is there a relationship between the per cent of nonwhites in a county and the median academic achievement level of high school seniors in that county?

6. Is there a relationship between the size of a county and the median academic achievement level of a county when the median intelligence level of the county is held constant by statistical methods?

7. Is there a relationship between the median intelligence level of a county and the median academic achievement level of a county when the per cent of nonwhites in the county is held constant by statistical methods?

8. Is there a relationship between the median total academic achievement level of a county and the socio-economic and intelligence levels when these two factors are combined with the best possible weighting by statistical methods?

9. Is the median academic achievement level of white high school seniors in a county related to the per cent of nonwhite persons in the county when county-wide medians of socio-economic and intelligence levels have been held constant by statistical methods?

10. Is there a relationship between the median academic achievement level of a county and its socio-economic index when the median intelligence level of the county is held constant by statistical methods?

11. Is there a relationship between the median total academic achievement level of a county and its socio-economic index when the intelligence level and size of the county have been held constant by statistical methods?

12. What inferences may be made concerning the variations found in the median measures of certain traits of whites and nonwhites throughout the counties represented in this study? In other words, can the county-wide median academic achievement levels of white and nonwhite high school seniors be fully understood without taking into consideration other factors? What are some of the factors which may contribute to the differences between white and nonwhite medians?

Since the above questions are concerned with the relationship between certain cultural differentials and the intelligence and academic achievement levels of high school seniors among the counties of Florida, it was necessary to develop measures of county-wide cultural differentials, intelligence levels, and academic achievement levels for whites, nonwhites, and the total population of each county represented in the study. As a result of reviewing some of the major studies dealing with the influences of environmental factors on the academic achievement of children, evidence was derived which indicated that community-wide

factors of schooling and income could be used as measures of socio-economic status. These studies also indicated that certain demographic factors--such as, the per cent of nonwhites in each county and the size of the county--could have some influence on the over-all median academic achievement of a county-wide school system.

In ascertaining the cultural differentials prevailing throughout the counties of Florida, measures of level of schooling and income were used in the development of county-wide socio-economic indexes for the white, nonwhite, and the total population of each county represented in the study. The two demographic factors previously cited were also used. The reasons for the selection of these particular socio-economic and demographic factors were explained in detail in the previous chapter. These socio-economic and demographic factors constitute the predictive variables (symbolized by S and X) in this study.

Through the utilization of the test scores made by those high school seniors who participated in the State-Wide Twelfth-Grade Testing Program, it was possible to compute median intelligence and academic achievement levels for the white, nonwhite, and combined white and nonwhite high school senior population of each county involved in the study. These measures of county-wide intelligence and academic achievement levels constitute the criterion variables, symbolized by Y in this study.

The basic data derived for this study are analyzed by means of statistical formulae primarily to obtain answers to the twelve basic questions in the study, including their counterparts in the form of

hypotheses. The formulae involve the computation of simple, partial, and multiple correlations. Levels of confidence are to be determined by consulting Snedecor's tabled values of r and R at the 1 and 5 per cent levels (2, p. 286).

Relationships Involved in the First Five Questions

The zero-order (Pearson Product-Moment) coefficients of correlation between each one of the predictive variables (symbolized by S and X) and the criterion variables (symbolized by Y) are shown in Tables 11, 13, and 14. In order to determine the relative significance of the derived r's, the values of R and r that are significantly different from 0 at the 5 per cent and 1 per cent levels are shown in Table 12.

The first five questions require the computation of numerous correlations across the counties of Florida, each county appearing in a correlation table as a unit case, and being represented by its measure of each trait under investigation. Since three distinctly different correlation tables are involved in each question, the results will be presented in terms of separate tables for the white, nonwhite, and total population in Florida counties.

QUESTION ONE: CORRELATIONS BETWEEN THE SOCIO-ECONOMIC AND ACADEMIC ACHIEVEMENT VARIABLES

The zero-order coefficients of correlation between each of the socio-economic and academic achievement factors involved in question one will be presented in separate tables for the white, nonwhite and

total population in Florida counties. The correlations for the white population will be based on an N of 67, whereas the correlations for the nonwhite and total population will be based on an N of 50. Sufficient data were available to include all counties in the development of the measures used in this study for the white population,[1] but this was not the case with the nonwhite population in seventeen Florida counties. For this reason, an N of 50 will be used in those instances in which the nonwhite or total population is involved.

The White Population

Table 11 shows the zero-order coefficients of correlation between each of the socio-economic factors (S_{1W}, S_{2W}, and S_{TW}) and the academic achievement variables (Y_{2W}, Y_{3W}, Y_{4W}, Y_{5W}, and Y_{TW}). Each of these relationships will be examined and analyzed in subsequent paragraphs.

The Relationship between Schooling and Academic Achievement

The values of r between schooling and academic achievement, shown in Table 11 and taken together with the values in Table 12, indicate that median years of school completed by adults* is significantly related to the five academic achievement variables. Listed

---

[1]The larger N of 67 was used to insure more representative results. As a check on the effect of the different N's, the correlations for the white population, based on an N of 50, have been computed and may be found in Table 17. It may be seen that these results do not differ appreciably from those based on an N of 67.

*The term "schooling" will henceforth be used in place of the complete descriptive wording.

in the order of their relationship with schooling (based on an N of 67 with 65 degrees of freedom), the r's are as follows:

Total Academic Achievement.	.73
English	.71
Social Studies.	.65
Natural Science	.64
Mathematics	.50

When it is realized that the value of r at the 1 per cent level of statistical significance is .31 with 65 degrees of freedom, it may then be understood why schooling is said to be significantly related to each of the above academic achievement variables. These relationships are strengthened by the fact that the attainment of a positive r of .31 (with 65 degrees of freedom) or larger through accidents of sampling fluctuation is likely to occur but once in 100 trials.

The Relationship between Income and Academic Achievement

The values of r between income and academic achievement, presented originally in Table 11, are statistically significant at the 1 per cent level.[1] Listed in the order of their relationship with income (based on an N of 67 with 65 degrees of freedom), the r's are as follows:

Total Academic Achievement.	.63
English	.62
Social Studies.	.60
Natural Science	.49
Mathematics	.42

[1]The value of r at the 1 per cent level of significance is .31 with 65 degrees of freedom (see Table 12).

TABLE 11

MATRIX OF SIMPLE CORRELATION COEFFICIENTS BASED ON 67 FLORIDA COUNTIES: WHITES

	S_{1W}	S_{2W}	S_{TW}	Y_{1W}	Y_{2W}	Y_{3W}	Y_{4W}	Y_{5W}	Y_{TW}	X_N	$X_{\%}$
S_{1W}	1.00	.66	.91	.69	.71	.65	.64	.50	.73	.08	.42
S_{2W}		1.00	.91	.55	.62	.60	.49	.42	.63	.22	.46
S_{TW}			1.00	.67	.73	.68	.61	.50	.74	.16	.49
Y_{1W}				1.00	.73	.76	.76	.58	.82	-.03	.42
Y_{2W}					1.00	.81	.72	.57	.93	.06	.43
Y_{3W}						1.00	.74	.61	.93	.05	.40
Y_{4W}							1.00	.48	.84	-.14	.33
Y_{5W}								1.00	.71	.18	.35
Y_{TW}									1.00	.04	.44
X_N										1.00	-.15
$X_{\%}$											1.00

S_{1W} = Years of school completed

S_{2W} = annual family income

S_{TW} = schooling and income combined

Y_{1W} = intelligence score

Y_{2W} = English score

Y_{3W} = social studies score

Y_{4W} = natural science score

Y_{5W} = mathematics score

Y_{TW} = total score on four-subject tests: English, social studies, natural science, and mathematics

X_N = per cent of county population that is nonwhite

$X_{\%}$ = per cent of total state population (size of county)

TABLE 12

MINIMUM VALUES OF R AND OF r THAT ARE SIGNIFICANTLY DIFFERENT FROM 0 AT THE 5% AND 1% LEVELS*

Number of Cases	Degrees of Freedom	Number of Variables	5% Level for R	1% Level for R	5% Level for r	1% Level for r
50	46	4**	.393	.466	.285	.368
50	47	3**	.346	.422	.282	.365
50	48	2	. . .	. . .	.279	.361
67	63	4**	.341	.406	.245	.318
67	64	3**	.301	.367	.243	.316
67	65	2	. . .	. . .	.241	.313

*From Snedecor (2, p. 286).

**For testing the significance of partial correlations, Snedecor (2, p. 286) has suggested that Table 13.5 on his page 286 should be entered under the column for two variables but the degrees of freedom being the number of cases minus the number of variables involved.

The Relationship between Schooling and Income Combined and Academic Achievement

The values of r between the measure of schooling and income combined and academic achievement, presented originally in Table 11, indicate that this combined socio-economic measure is significantly related to the five academic achievement variables at the 1 per cent level. Listed in the order of their relationship with the measure of schooling and income combined (based on an N of 67 with 65 degrees of freedom), the r's are as follows:

Total Academic Achievement.	.74
English	.73
Social Studies.	.68
Natural Science	.61
Mathematics	.50

Analysis

The zero-order correlations between the socio-economic and academic achievement variables for the white population, presented originally in Table 11, are listed below in summary form.

	Y_{2W} English	Y_{3W} Social Studies	Y_{4W} Natural Science	Y_{5W} Mathematics	Y_{TW} Total
S_{1W} Schooling	.71	.65	.64	.50	.73
S_{2W} Income	.62	.60	.49	.42	.63
S_{TW} Combined	.73	.68	.61	.50	.74

While all the correlations in the above summary are significant at the 1 per cent level, it is to be noted that the highest r's are those in the top and bottom rows, and in these rows the lowest correlations are those with natural science and mathematics. It should be further noted that all the correlation coefficients (except two) are .50 or above and are therefore reasonably high. These results tend to indicate that county-wide background factors are associated with the academic achievement of white high school seniors, this association being greater for schooling of adults than for income, and higher in English and social studies than in natural science and mathematics.

Apparently achievement in natural science and mathematics is more a result of formal instruction at school than a matter of home and county-wide environmental associations and influences.

The Nonwhite Population

The zero-order coefficients of correlation between each of the socio-economic factors (S_{1N}, S_{2N}, and S_{TN}) and the academic achievement factors (Y_{2N}, Y_{3N}, Y_{4N}, Y_{5N}, and Y_{TN} are shown in Table 13. Each of these relationships will be examined and analyzed in subsequent paragraphs.

The Relationship between Schooling and Academic Achievement

The values of r between schooling and academic achievement are shown in Table 13. Listed in the order of their relationship with the measure of schooling (based on an N of 50 with 48 degrees of freedom), the r's are as follows:

Total Academic Achievement.	.36
English	.33
Natural Science	.31
Social Studies.	.25
Mathematics	.15

The above summary shows that total academic achievement is the only variable which is significantly related to schooling at the 1 per cent level.[1] While English and natural science are significantly

[1]The value of r at the 1 per cent level of significance is .36 with 48 degrees of freedom (see Table 12).

TABLE 13

MATRIX OF SIMPLE CORRELATION COEFFICIENTS BASED ON 50 FLORIDA COUNTIES: NONWHITES

	S_{1N}	S_{2N}	S_{TN}	Y_{1N}	Y_{2N}	Y_{3N}	Y_{4N}	Y_{5N}	Y_{TN}	X_N	$X_{\%}$
S_{1N}	1.00	.60	.90	.38	.33	.25	.31	.15	.36	-.55	.53
S_{2N}		1.00	.89	.45	.46	.42	.32	.25	.51	-.27	..54
S_{TN}			1.00	.46	.44	.37	.36	.22	.48	-.46	.60
Y_{1N}				1.00	.62	.21	.26	.10	.47	-.27	.32
Y_{2N}					1.00	.41	.43	.32	.81	-.13	.33
Y_{3N}						1.00	.71	.54	.83	-.19	.32
Y_{4N}							1.00	.55	.81	-.21	.33
Y_{5N}								1.00	.61	-.19	.04
Y_{TN}									1.00	-.21	.38
X_N										1.00	-.23
$X_{\%}$											1.00

S_{1N} = years of school completed

S_{2N} = annual family income

S_{TN} = schooling and income combined

Y_{1N} = psychological (intelligence) score

Y_{2N} = English score

Y_{3N} = social studies score

Y_{4N} = natural science score

Y_{5N} = mathematics score

Y_{TN} = total score on four subject tests: English, social studies, natural science, and mathematics

X_N = per cent of county population that is nonwhite

$X_{\%}$ = per cent of total state population (size of county)

related to schooling at the 5 per cent level,[1] the two remaining variables of social studies and mathematics are not significantly related to schooling at the 1 or the 5 per cent level. It should be noted, however, that the r between schooling and social studies (.25) is approaching significance at the 5 per cent level.

The Relationship between Income and Academic Achievement

The values of r between income and academic achievement are shown in Table 13. Listed in the order of their relationship with income (based on an N of 50 with 48 degrees of freedom), the r's are as follows:

Total Academic Achievement.	.51
English	.46
Social Studies.	.42
Natural Science	.32
Mathematics	.25

It may be seen from the values of r in the above summary that income is significantly related to three of the five academic achievement variables at the 1 per cent level.[2] Of the remaining two variables, natural science is significantly related to income at the 5 per cent level, whereas mathematics appears to be approaching significance at the 5 per cent level.[3]

---

[1]The value of r at the 5 per cent level of significance is .279 with 48 degrees of freedom (see Table 12).

[2]The value of r at the 1 per cent level of significance is .36 with 48 degrees of freedom (see Table 12).

[3]The value of r at the 5 per cent level of significance is .279 with 48 degrees of freedom (see Table 12).

The Relationship between Schooling and Income Combined and Academic Achievement

The values of r between the measure of schooling and income combined and the five academic achievement variables are shown in Table 13. Listed in the order of their relationship with the measure of schooling and income combined (based on an N of 50 with 48 degrees of freedom), the r's are as follows:

Total Academic Achievement.	.48
English	.44
Social Studies.	.37
Natural Science	.36
Mathematics	.22

The values of r in the above summary indicate that the measure of schooling and income combined is significantly related to total academic achievement, English, social studies, and natural science at the 1 per cent level.[1] It may be seen that the remaining variable, mathematics, with an r of .22, does not meet the test of statistical significance in its relationship with the measure of schooling and income combined at the 1 or the 5 per cent level.[2]

Analysis

The coefficients of correlation between the socio-economic and academic achievement variables for the nonwhite population, presented originally in Table 13, are listed below for comparison.

---

[1]The value of r at the 1 per cent level of significance is .36 with 48 degrees of freedom (see Table 12).

[2]The value of r at the 5 per cent level of significance is .279 with 48 degrees of freedom (see Table 12).

	Y_{2N} English	Y_{3N} Social Studies	Y_{4N} Natural Science	Y_{5N} Mathematics	Y_{TN} Total
S_{1N} Schooling	.33	.25	.31	.15	.36
S_{2N} Income	.46	.42	.32	.25	.51
S_{TN} Combined	.44	.37	.36	.22	.48

The above correlations reveal that the highest degree of relationship found exists between academic achievement and income of families. In four out of five cases, this relationship is higher than that for the combined socio-economic index. This represents an interesting shift from the results for the whites. There, the schooling of the adult generation was the strong influential factor. For the nonwhites, the important variable becomes the income of the nonwhite families. This condition may result from the fact that few nonwhite adults had any large amount of formal schooling.

It is worthy of note that the lowest relationships between individual measures of socio-economic levels and academic achievement are with natural science and mathematics. When these measures of socio-economic level are combined, the lowest relationships still remain with natural science and mathematics. Apparently achievement of nonwhite pupils in natural science and mathematics is more closely associated with such factors as formal school instruction, peer associations at school, and many other factors than it is with county-wide economic and cultural influences.

The Total Population

The zero-order coefficients of correlation between each of the socio-economic factors (S_{1P}, S_{2P}, and S_{TP}) and the academic achievement variables (Y_{2P}, Y_{3P}, Y_{4P}, Y_{5P}, and Y_{TP}) are shown in Table 14. Each of these relationships will be examined and analyzed in subsequent paragraphs.

The Relationship between Schooling and Academic Achievement

The values of r between schooling and academic achievement are shown in Table 14. Listed in the order of their relationship with the measure of schooling (based on an N of 50 with 48 degrees of freedom), the r's are as follows:

Social Studies	.76
Total Academic Achievement	.71
English	.65
Mathematics	.62
Natural Science	.48

The above correlations indicate that schooling is significantly related to each of the academic achievement variables at the 1 per cent level.[1]

The Relationship between Income and Academic Achievement

The values of r between income and academic achievement are shown in Table 14. Listed in the order of their relationship with the measure of income (based on an N of 50 with 48 degrees of freedom), the r's are as follows:

---

[1]See Table 12 for the significant value of r at the 1 per cent level.

TABLE 14

MATRIX OF SIMPLE CORRELATION COEFFICIENTS BASED ON 50 FLORIDA COUNTIES: WHITES AND NONWHITES (TOTAL POPULATION)

	S_{1P}	S_{2P}	S_{TP}	Y_{1P}	Y_{2P}	Y_{3P}	Y_{4P}	Y_{5P}	Y_{TP}	X_N	$X_{\%}$
S_{1P}	1.00	.76	.94	.80	.65	.76	.48	.62	.71	-.55	.45
S_{2P}		1.00	.93	.70	.67	.71	.50	.62	.70	-.42	.63
S_{TP}			1.00	.80	.70	.78	.52	.66	.75	-.52	.57
Y_{1P}				1.00	.86	.88	.65	.82	.89	-.32	.50
Y_{2P}					1.00	.86	.65	.84	.94	-.23	.55
Y_{3P}						1.00	.70	.86	.95	-.31	.63
Y_{4P}							1.00	.63	.81	-.25	.41
Y_{5P}								1.00	.90	-.22	.48
Y_{TP}									1.00	-.28	.59
X_N										1.00	-.23
$X_{\%}$											1.00

S_{1P} = years of school completed

S_{2P} = annual family income

S_{TP} = schooling and income combined

Y_{1P} = psychological (intelligence) score

Y_{2P} = English score

Y_{3P} = social studies score

Y_{4P} = natural science score

Y_{5P} = mathematics score

Y_{TP} = total on four subject tests: English, social studies, natural science and mathematics

X_N = per cent of county population that is nonwhite

$X_{\%}$ = per cent of total state population (size of county)

Social Studies	.71
Total Academic Achievement	.70
English	.67
Mathematics	.62
Natural Science	.50

The values of r in the above summary indicate that income is significantly related to each one of the five academic achievement variables at the 1 per cent level.

The Relationship between Schooling and Income Combined and Academic Achievement

The values of r between schooling and income combined and academic achievement are shown in Table 14. Listed in descending order, these values of r are as follows:

Social Studies	.78
Total Academic Achievement	.75
English	.70
Mathematics	.66
Natural Science	.52

All the correlations in the above summary are statistically significant at the 1 per cent level.[1]

Analysis

The correlations between the socio-economic and academic achievement variables for the total population, presented originally in Table 14, are listed below in summary form.

---

[1]See Table 12 for the significant value of r at the 1 per cent level.

	Y_{2P} English	Y_{3P} Social Studies	Y_{4P} Natural Science	Y_{5P} Mathematics	Y_{TP} Total
S_{1P} Schooling	.65	.76	.48	.62	.71
S_{2P} Income	.67	.71	.50	.62	.70
S_{TP} Combined	.70	.78	.52	.66	.75

The county-wide measures of socio-economic factors involved in this study appear to be associated to a considerable extent with county-wide levels of academic achievement in all areas represented in the Florida State-Wide Twelfth-Grade Testing Program. It is quite apparent that Florida counties do reflect the pressures and strengths of the economic and cultural environments in which their high school seniors grow up, interact, and learn. It is also quite apparent that the measures of socio-economic level employed in this study are more closely associated with the achievement of high school seniors in the areas of social studies and English than they are with the areas of mathematics and natural science.

QUESTION TWO: CORRELATIONS BETWEEN SOCIO-ECONOMIC VARIABLES AND INTELLIGENCE

The zero-order coefficients of correlation between each of the socio-economic variables and intelligence will be presented in separate tables for the white, the nonwhite, and the total population in Florida counties. As was stated in question one, the correlations for the white population will be based on an N of 67, whereas the correlations for the nonwhite and total population will be based on an N of 50.

The White Population

The zero-order coefficients of correlation between each of the socio-economic factors (S_{1W}, S_{2W}, and S_{TW}) and intelligence (Y_{1W}) are shown in Table 11. These relationships will be analyzed in the order of their appearance in the summary which follows.

	Y_{1W} Intelligence
S_{1W} Schooling.	.69
S_{2W} Income	.55
S_{TW} Combined	.67

All the correlations in the above summary are statistically significant at the 1 per cent level.[1] The highest correlation is found to exist between schooling and intelligence. This does not necessarily mean that a causal relationship exists between schooling of adults and intelligence of pupils. The coefficients of correlation indicate that intelligence, schooling, and income are all intercorrelated and presumably exert a reciprocal influence on each other.

The Nonwhite Population

The zero-order coefficients of correlation between each of the socio-economic factors (S_{1N}, S_{2N}, and S_{TN}) and intelligence (Y_{1N}) were originally shown in Table 13. These relationships will be analyzed in the order of their appearance in the summary which follows.

---

[1]The value of r at the 1 per cent level of significance is .31 with 65 degrees of freedom (see Table 12).

	Y_{1N} Intelligence
S_{1N} Schooling	.38
S_{2N} Income	.45
S_{TN} Combined	.46

While all the correlations in the above summary are statistically significant at the 1 per cent level,[1] it is notable that these correlations are appreciably lower than those which were found for the white population in the first part of this question. It is quite possible that the lower correlations for the nonwhite population may be attributed to the fact of less variability in this group than in the white and total population.

As found for school achievement, nonwhite income levels are more highly associated with intelligence than are levels of schooling. Nonwhite seniors perform better academically in those counties in which the income level for nonwhites is high.

The Total Population

The zero-order coefficients of correlation between each of the socio-economic factors (S_{1P}, S_{2P}, and S_{TP}) and intelligence (Y_{1P}), shown originally in Table 14, are listed below for comparison.

---

[1]The value of r at the 1 per cent level of significance is .36 with 48 degrees of freedom (see Table 12).

		Y_{1P}
		Intelligence
S_{1P}	Schooling.	.80
S_{2P}	Income	.70
S_{TP}	Combined	.80

It may be seen that all three of these correlations are high. It would also appear that county-wide levels of adult schooling are more closely associated with county-wide levels of pupil intelligence than is county-wide level of income.

QUESTION THREE: CORRELATIONS BETWEEN INTELLIGENCE AND ACADEMIC ACHIEVEMENT

The zero-order coefficients of correlation between each of the academic achievement variables and intelligence involved in this question will be presented in terms of separate tables for the white, nonwhite, and total population in Florida counties. As was stated in the previous questions, the correlations for the white population will be based on an N of 67, whereas the correlations for the nonwhite and total population will be based on an N of 50.

The White Population

The zero-order coefficients of correlation between intelligence (Y_{1W}) and the academic achievement variables (Y_{2W}, Y_{3W}, Y_{4W}, Y_{5W}, and Y_{TW}) are shown in Table 11. The correlations involved in this part of question three are presented below in summary form.

Y_{1W}	Y_{2W} English	Y_{3W} Social Studies	Y_{4W} Natural Science	Y_{5W} Mathematics	Y_{TW} Total
Intelligence	.73	.76	.76	.58	.82

Analysis

The above correlations point to a powerful association between the intelligence level and academic achievement levels of Florida counties. The highest correlation with intelligence is with total academic achievement, whereas the lowest correlation with intelligence is found to be with mathematics. Due to the high degree of association between county-wide intelligence and academic achievement variables, these relationships will be subject to further investigation, the results of which will be reported in subsequent material.

The Nonwhite Population

The zero-order coefficients of correlation between intelligence (Y_{1N}) and the academic achievement variables (Y_{2N}, Y_{3N}, Y_{4N}, Y_{5N}, and Y_{TN}) are shown in Table 13. The correlations involved in this part of question three are presented below.

Y_{1N}	Y_{2N} English	Y_{3N} Social Studies	Y_{4N} Natural Science	Y_{5N} Mathematics	Y_{TN} Total
Intelligence	.62	.21	.26	.10	.47

Analysis

Among these five correlations only two factors, total academic achievement and English, are significantly related to intelligence at the 5 per cent level.[1]

As compared with the correlations for the white population, these correlations are strikingly low. The correlation for intelligence and total academic achievement is .35 below the figure for the white population. The r of .62 between intelligence and English approaches the figure of .73 found for the white population, but the other r's are approximately one-third or one-fourth of those for the white population. It is quite possible that the low r's are due to a restricted (small) range of variation in the achievement levels of the nonwhite high school seniors.

The Total Population

The zero-order coefficients of correlation between intelligence (Y_{1P}) and the academic achievement variables (Y_{2P}, Y_{3P}, Y_{4P}, Y_{5P}, and Y_{TP}) are shown in Table 14. The correlations involved in this part of question three are presented below in summary form.

Y_{1P}	Y_{2P} English	Y_{3P} Social Studies	Y_{4P} Natural Science	Y_{5P} Mathematics	Y_{TP} Total
Intelligence	.86	.88	.65	.82	.89

[1]The value of r at the 5 per cent level of significance is .279 for 48 degrees of freedom (see Table 12).

Analysis

These coefficients of correlation are all rather high, three of them notably so. These relationships have been subjected to further investigation, the results of which are reported in answers to subsequent questions.

QUESTION FOUR: CORRELATIONS BETWEEN SIZE OF COUNTY AND ACADEMIC ACHIEVEMENT

The zero-order coefficients of correlation between the demographic factor of size of county (X_6) and each of the academic achievement variables involved in this question will be presented in separate tables for the white, nonwhite, and total population in Florida counties. Data for the white population will be based on an N of 67, whereas the data for the nonwhite and total population will be based on an N of 50.

The White Population

The zero-order coefficients of correlation between the demographic factor of size of county (X_6) and the academic achievement factors (Y_{2W}, Y_{3W}, Y_{4W}, Y_{5W}, and Y_{TW}) are shown in Table 11. The correlations involved in this part of question four are presented below in summary form.

X_6	Y_{2W} English	Y_{3W} Social Studies	Y_{4W} Natural Science	Y_{5W} Mathematics	Y_{TW} Total
Size of County	.43	.40	.33	.35	.44

Analysis

The correlations between size of a county and academic achievement indicate that size of county is moderately associated with the academic achievement levels of counties in Florida. This association between size of county and county-wide academic achievement levels has been subject to further investigation, the results of which are reported in answers to subsequent questions.

The Nonwhite Population

The zero-order coefficients of correlation between the demographic factor of size of county ($X_{\%}$) and the academic achievement factors (Y_{2N}, Y_{3N}, Y_{4N}, Y_{5N}, and Y_{TN}) are shown in Table 13. The correlations involved in this part of question four are presented below in summary form.

$X_{\%}$	Y_{2N} English	Y_{3N} Social Studies	Y_{4N} Natural Science	Y_{5N} Mathematics	Y_{TN} Total
Size of County	.33	.32	.33	.04	.38

Analysis

The values of r between size of county and the five areas of academic achievement indicate that, with the exception of the area of mathematics, size of county is significantly related to total academic achievement at the 1 per cent level,[1] followed by statistically

[1]The value of r at the 1 per cent level of significance is .36 with 48 degrees of freedom.

significant relationships with English, natural science, and social studies at the 5 per cent level.[1]

As compared with the white population, these correlations are, with the exception of mathematics, essentially the same. The abrupt drop of mathematics to insignificance for the nonwhite population suggests the possibility that achievement in mathematics is perhaps more closely associated with the quality of teaching in certain counties, the fact that two or more years of mathematics are required for graduation in most nonwhite high schools in Florida (1, p. 13), and many other factors. Investigations should be undertaken to determine what some of the influences are.

The Total Population

The zero-order coefficients of correlation between the demographic factor of size of county ($X_{\%}$) and the academic achievement variables (Y_{2P}, Y_{3P}, Y_{4P}, Y_{5P}, and Y_{TP}) are shown in Table 14. The correlations involved in this part of question four are presented below in summary form.

$X_{\%}$	Y_{2P} English	Y_{3P} Social Studies	Y_{4P} Natural Science	Y_{5P} Mathematics	Y_{TP} Total
Size of County	.55	.63	.41	.48	.59

[1]The value of r at the 5 per cent level of significance is .279 with 48 degrees of freedom.

Analysis

It is apparent that size of county is associated to a considerable degree with the over-all academic achievement which characterizes Florida counties. This relationship between size of county and academic achievement has been subjected to further investigation, the results of which are reported in answers to subsequent questions.

QUESTION FIVE: CORRELATIONS BETWEEN THE PER CENT OF NONWHITES AND THE FIVE ACADEMIC ACHIEVEMENT VARIABLES

The zero-order coefficients of correlation between the demographic factor of per cent of nonwhites in a county (X_N) and each of the academic achievement variables involved in this question will be presented in terms of separate tables for the white, nonwhite, and total population in Florida counties. The correlations for the white population will be based on an N of 67, whereas the correlations for the nonwhite and total population will be based on an N of 50.

The White Population

The zero-order coefficients of correlation between the demographic factor (X_N) and the academic achievement variables (Y_{2W}, Y_{3W}, Y_{4W}, Y_{5W}, and Y_{TW}) are shown in Table 11. The correlations involved in this part of question five are presented below in summary form.

X_N	Y_{2W} English	Y_{3W} Social Studies	Y_{4W} Natural Science	Y_{5W} Mathematics	Y_{TW} Total
Per Cent of County That Is Nonwhite	.06	.05	-.14	.18	.04

Analysis

The values of r between the per cent of nonwhites in a county and academic achievement indicate that the per cent of nonwhites is more or less negligibly related to all five of the areas of academic achievement throughout the counties of Florida. It should be mentioned, however, that the areas of mathematics and natural science appear to be associated with the per cent of nonwhites in a county in a way that is somewhat different from the other areas of academic achievement.

The Nonwhite Population

The zero-order coefficients of correlation between the demographic factor X_N and the academic achievement factors (Y_{2N}, Y_{3N}, Y_{4N}, Y_{5N}, and Y_{TN}) are shown in Table 13. The correlations involved in this part of question five are presented below in summary form.

X_N	Y_{2N} English	Y_{3N} Social Studies	Y_{4N} Natural Science	Y_{5N} Mathematics	Y_{TN} Total
Per Cent of County That Is Nonwhite	-.13	-.19	-.21	-.19	-.21

Analysis

The correlations in this part of question five for the nonwhite population are all virtually negligible. There is some indication that the per cent of a county that is nonwhite is approaching a

significant negative relationship with total academic achievement, natural science, and mathematics at the 5 per cent level.[1]

There is every indication that the larger the proportion of nonwhites in a county, the lower the level of academic achievement in all subjects tested. There is also some indication that, if there were more variation among counties in the per cent of nonwhites, the correlations might be still larger (in a negative direction).

The Total Population

The zero-order coefficients of correlation between the demographic factor of per cent of nonwhites in a county (X_N) and each of the academic achievement variables (Y_{2P}, Y_{3P}, Y_{4P}, Y_{5P}, and Y_{TP}) are shown in Table 14. The correlations involved in this part of question five are presented below in summary form.

X_N	Y_{2P} English	Y_{3P} Social Studies	Y_{4P} Natural Science	Y_{5P} Mathematics	Y_{TP} Total
Per Cent of County That Is Nonwhite	-.23	-.31	-.25	-.22	-.28

Analysis

The values of r in the preceding summary between the per cent of nonwhites in a county and academic achievement reveal a significant

---

[1]The value of r at the 5 per cent level of significance is .279 with 48 degrees of freedom.

negative relationship between the per cent of nonwhites in a county and the areas of social studies and total academic achievement at the 5 per cent level.[1] Natural science, English, and mathematics appear to be approaching a significant negative relationship with the per cent of nonwhites in a county at the 5 per cent level.

When the test scores of white and nonwhite high school seniors are combined, for each county, the r between the per cent of each county that is nonwhite and county-wide academic achievement is still negative, but it is larger in a negative direction.

The fact that the r's are in the .20's suggests that factors other than the per cent of nonwhites are largely influential in determining the academic achievement levels of high school seniors in the counties of Florida. The factor of per cent of nonwhites in a county and other factors have been subjected to further statistical analysis, the results of which are reported in answers to subsequent questions.

Relationships Involved in Questions Six through Twelve

The remaining seven questions require the computation of numerous partial and multiple correlations across the counties of Florida, each county appearing as a unit case, and being represented by its measure of each trait under investigation. Whereas the first five questions involved the use of data which were analyzed and separated for the white, nonwhite, and total population in each county, the remaining

---

[1]The value of r at the 5 per cent level of significance is .279 with 48 degrees of freedom.

questions will make use of data which will be analyzed and presented in terms of the needs of the specific question under consideration.

QUESTION SIX: PARTIAL COEFFICIENTS OF CORRELATION BETWEEN SIZE OF COUNTY AND ACADEMIC ACHIEVEMENT, WITH INTELLIGENCE LEVEL HELD CONSTANT

The partial coefficients of correlation between the size of a county ($X_{\%}$) and the academic achievement variables (with county-wide levels of intelligence held constant) involved in this question will be presented in separate tables for the white, nonwhite, and total population in Florida counties. The partial correlations for the white, nonwhite, and total population will be based on an N of 50.

The White Population

The partial coefficients of correlation between the size of a county ($X_{\%}$) and the five academic achievement variables (Y_{2W}, Y_{3W}, Y_{4W}, Y_{5W}, and Y_{TW}), with intelligence level (Y_{1W}) held constant, are shown in Table 15. Listed in the order of their relationship with size of county, the partial r's are as follows:

$$r\ X_{\%}\ Y_{2W} \cdot Y_{1W} = .23$$

$$r\ X_{\%}\ Y_{TW} \cdot Y_{1W} = .20$$

$$r\ X_{\%}\ Y_{3W} \cdot Y_{1W} = .18$$

$$r\ X_{\%}\ Y_{5W} \cdot Y_{1W} = .13$$

$$r\ X_{\%}\ Y_{4W} \cdot Y_{1W} = .01$$

TABLE 15

PARTIAL CORRELATION COEFFICIENTS BETWEEN SIZE OF COUNTY AND FIVE ACADEMIC ACHIEVEMENT VARIABLES WITH INTELLIGENCE LEVEL HELD CONSTANT

	English	Social Studies	Natural Science	Mathematics	Total
	Y_{2W}	Y_{3W}	Y_{4W}	Y_{5W}	Y_{TW}
White Population (Y_{1W} held constant)	.23	.18	.01	.13	.20
	Y_{2N}	Y_{3N}	Y_{4N}	Y_{5N}	Y_{TN}
Nonwhite Population (Y_{1N} held constant)	.18	.27	.27	.01	.28
	Y_{2P}	Y_{3P}	Y_{4P}	Y_{5P}	Y_{TP}
Combined Population (Y_{1P} held constant)	.27	.46	.12	.14	.35

TABLE 16

MULTIPLE R's BETWEEN MEDIAN TOTAL ACADEMIC ACHIEVEMENT AND THE COMBINED INFLUENCES OF THE SOCIO-ECONOMIC INDEX AND INTELLIGENCE LEVEL 50 FLORIDA COUNTIES

White Population Y_{TW} $(S_{TW}Y_{1W})$	.86
Nonwhite Population Y_{TN} $(S_{TN}Y_{1N})$	.57
Combined Population Y_{TP} $(S_{TP}Y_{1P})$	.89

Analysis

The partial r's in the preceding summary indicate that English ranks first among the variables and appears to be approaching significance at the 5 per cent level.[1] Total academic achievement and social studies also appear to be approaching significance at the 5 per cent level, while mathematics and science have r's of .13 and .01, respectively, which are considered negligible.

A comparison of these partial r's with the zero-order r's between size of county and academic achievement shows that the resultant partial r's are cut in half when intelligence is held constant. Apparently size of county contributes more to achievement in English, total academic achievement, and social studies than it does to mathematics and science. The noticeable variation in the partial r's among the areas of academic achievement, however, suggests that numerous factors other than size of county are strong contributors to achievement in these specific areas.

The Nonwhite Population

The partial r's between size of county and the five academic achievement variables (Y_{2N}, Y_{3N}, Y_{4N}, Y_{5N}, and Y_{TN}), with intelligence

---

[1]For testing the significance of partial correlations, Snedecor (2, p. 296) has suggested that Table 13.5 on page 286 should be entered under the column for two variables with the degrees of freedom being N - 3. The value of r, according to Snedecor's Table 13.5, is .282 at the 5 per cent level of significance with 47 degrees of freedom.

(Y_{1N}) held constant, are shown in Table 15. Listed in the order of their relationship with size of county, the partial r's are as follows:

$$r\ X_{\%}\ Y_{TN} \cdot Y_{1N} = .28$$

$$r\ X_{\%}\ Y_{4N} \cdot Y_{1N} = .27$$

$$r\ X_{\%}\ Y_{3N} \cdot Y_{1N} = .27$$

$$r\ X_{\%}\ Y_{2N} \cdot Y_{1N} = .18$$

$$r\ X_{\%}\ Y_{5N} \cdot Y_{1N} = .01$$

Analysis

The partial r's in the preceding summary indicate that total academic achievement is significantly related to size of county at the 5 per cent level.[1] Social studies and science may be said to be approaching significance at the 5 per cent level, while the remaining partial r's for English and mathematics are low and considered negligible.

In a comparison of these partial r's with the zero-order r's between size of county and academic achievement, shown previously for the nonwhite population, it may be noted that, when intelligence is held constant, the resultant partial r's are reduced about one-fourth. It would appear, then that, when intelligence is held constant, size of county is associated to a lesser degree with English and mathematics than it is with total academic achievement, social studies, and natural science.

---

[1]The value of r, according to Snedecor (2, p. 296) is .282 at the 5 per cent level of significance with 47 degrees of freedom.

The Total Population

The partial r's between size of county and the academic achievement variables (Y_{2P}, Y_{3P}, Y_{4P}, Y_{5P}, and Y_{TP}), with intelligence (Y_{1P}) held constant, are shown in Table 14. Listed in the order of their relationship with X_{p} (based on an N of 50), the partial r's are as follows:

$$r\ X_{p}\ Y_{3P} \cdot Y_{1P} = .46$$
$$r\ X_{p}\ Y_{TP} \cdot Y_{1P} = .35$$
$$r\ X_{p}\ Y_{2P} \cdot Y_{1P} = .27$$
$$r\ X_{p}\ Y_{5P} \cdot Y_{1P} = .14$$
$$r\ X_{p}\ Y_{4P} \cdot Y_{1P} = .12$$

Analysis

The partial r's in the preceding summary indicate that social studies is significantly related to size of county at the 1 per cent level.[1] Total academic achievement appears to be approaching significance at the 1 per cent level, whereas English may be said to be approaching significance at the 5 per cent level.[2] The partial r's for mathematics and natural science are low and considered negligible.

In a comparison of these partial r's with the zero-order r's between size of county and academic achievement, shown previously for the total population, it may be noted that, when intelligence is held constant, the resultant partial r's are severely reduced. Apparently

---

[1]The value of r, according to Snedecor (2, p. 296) is .365 at the 1 per cent level of significance with 47 degrees of freedom. This value is also shown in Table 12.

[2]See Table 12 for the value of r at the 5 per cent level of significance.

size of county is associated with social studies, total academic achievement, and English to a greater degree than it is with mathematics and natural science.

QUESTION SEVEN: PARTIAL COEFFICIENTS OF CORRELATION BETWEEN THE INTELLIGENCE LEVEL OF A COUNTY AND ACADEMIC ACHIEVEMENT, WITH PER CENT OF NONWHITES IN THE COUNTY HELD CONSTANT

The partial coefficients of correlation between the intelligence level of a county and the five academic achievement variables (with the per cent of nonwhites in a county held constant) involved in this question will be presented solely in terms of a table for the white population in Florida counties. The correlations will be based on an N of 50.

The White Population

The partial r's between the intelligence level of a county (Y_{1W}) and the five academic achievement variables (Y_{2W}, Y_{3W}, Y_{4W}, Y_{5W}, and Y_{TW}), with per cent of nonwhites in a county (X_N) held constant, are presented below in summary form.

$$r\ Y_{1W}\ Y_{TW} \cdot X_N = .83$$

$$r\ Y_{1W}\ Y_{4W} \cdot X_N = .80$$

$$r\ Y_{1W}\ Y_{3W} \cdot X_N = .75$$

$$r\ Y_{1W}\ Y_{2W} \cdot X_N = .74$$

$$r\ Y_{1W}\ Y_{5W} \cdot X_N = .65$$

Analysis

In an effort to analyze more effectively the partial r's and the simple r's involved in this question, zero-order coefficients of correlation were calculated between intelligence and academic achievement, based on an N of 50. These results, shown in Table 17, are presented below in summary form.

Y_{1W}	Y_{2W} English	Y_{3W} Social Studies	Y_{4W} Natural Science	Y_{5W} Mathematics	Y_{TW} Total
Intelligence	.73	.75	.81	.62	.82

It may be noted that the partial r's involved in this question are not appreciably different from the simple r's. Both sets of r's show statistically significant relationships for all the variables at the 1 per cent level.[1] Since the rank of each variable for the partial and simple r's is identical, this would tend to confirm the finding that the per cent of nonwhites in a county does not affect appreciably one area of achievement more than it does another. It would appear, then, that the per cent of nonwhites in a county does not seriously affect the relationship between intelligence and academic achievement of the white high school seniors throughout the counties of Florida.

---

[1]See Table 12 for these significant values of r.

TABLE 17

MATRIX OF SIMPLE CORRELATION COEFFICIENTS BASED ON 50 FLORIDA COUNTIES: WHITES

	S_{1W}	S_{2W}	S_{TW}	Y_{1W}	Y_{2W}	Y_{3W}	Y_{4W}	Y_{5W}	Y_{TW}	X_N	$X_{\%}$
S_{1W}	1.00	.62	.90	.72	.71	.64	.70	.54	.74	-.14	.39
S_{2W}		1.00	.90	.59	.69	.61	.55	.46	.67	.03	.51
S_{TW}			1.00	.73	.78	.69	.69	.56	.78	-.06	.50
Y_{1W}				1.00	.73	.75	.81	.62	.82	-.15	.44
Y_{2W}					1.00	.83	.72	.63	.94	-.02	.43
Y_{3W}						1.00	.71	.72	.94	-.04	.44
Y_{4W}							1.00	.58	.83	-.21	.36
Y_{5W}								1.00	.78	.16	.36
Y_{TW}									1.00	-.04	.46
X_N										1.00	-.23
$X_{\%}$											1.00

S_{1W} = years of school completed

S_{2W} = annual family income

S_{TW} = schooling and income combined

Y_{1W} = intelligence score

Y_{2W} = English score

Y_{3W} = social studies score

Y_{4W} = natural science score

Y_{5W} = mathematics score

Y_{TW} = total score on four subject tests: English, social studies, natural science, and mathematics

X_N = per cent of county population that is nonwhite

$X_{\%}$ = per cent of total state population (size of county)

QUESTION EIGHT: MULTIPLE COEFFICIENTS OF CORRELATION BETWEEN TOTAL ACADEMIC ACHIEVEMENT AND THE COMBINED INFLUENCES OF SOCIO-ECONOMIC FACTORS AND INTELLIGENCE AMONG 50 FLORIDA COUNTIES

The multiple R's between median total academic achievement and the combined influences of socio-economic factors and intelligence involved in this question will be presented in separate tables for the white, nonwhite and total population in 50 Florida counties.

The White Population

The multiple R between the median total academic achievement level of a county (Y_{TW}) and the combined influences of the socio-economic composite, or total index (S_{TW}), and intelligence (Y_{1W}) for the white population is shown in Table 16. It may be seen that this value of R is .86 and is considered highly significant at the 1 per cent level.[1]

Analysis

A comparison of the zero-order r's between Y_{TW} and S_{TW} (.73),* Y_{TW} and Y_{1W} (.82),** and the multiple R between Y_{TW} (S_{TW}, Y_{1W}), which reveals a value of .86, shows that all relationships are significant at the 1 per cent level. By combining S_{TW} and Y_{1W} the relationship

---

[1]The value of R at the 1 per cent of significance is .422 with three variables and 47 degrees of freedom (see Table 12).

*Datum taken from Table 17.

**Datum taken from Table 17.

with total academic achievement becomes appreciably more significant. This would indicate that both intelligence and socio-economic factors are highly associated with the over-all academic achievement level of the counties represented in this study.

The Nonwhite Population

The multiple R between the median total academic achievement level of a county (Y_{TN}) and the combined influences of the socio-economic composite, or total index (S_{TN}), and intelligence (Y_{1N}) for the nonwhite population is shown in Table 16. It may be seen that this value of R is .57 and is considered highly significant at the 1 per cent level.[1]

Analysis

In making a comparison of the zero-order r's between Y_{TN} and S_{TN} (.48),* Y_{TN} and Y_{1N} (.47),** and the multiple R between Y_{TN} (S_{TN},Y_{1N}), which reveals a value of .57, it is to be noted that all relationships are significant at the 1 per cent level. By combining S_{TN} and Y_{1N} the relationship with total academic achievement is made more significant. This would indicate that both intelligence and socio-economic factors are highly associated with the over-all academic achievement level of the counties represented in this study.

---

[1]The value of R at the 1 per cent level of significance is .422 with three variables and 47 degrees of freedom (see Table 12).

*Datum taken from Table 13.

**Datum taken from Table 13.

The Total Population

The multiple R between the median total academic achievement level of a county (Y_{TP}) and the combined influences of the socio-economic composite or total index (S_{TP}) and the intelligence level (Y_{1P}) for the total population is shown in Table 16. It may be seen that this value of R is .892 and is highly significant at the 1 per cent level.[1]

Analysis

A comparison of the zero-order r's between Y_{TP} and S_{TP} (.75),* Y_{TP} and Y_{1P} (.89),** reveals that all relationships are highly significant at the 1 per cent level.[2] By combining S_{TP} and Y_{1P} the relationship with total academic achievement appears to have increased slightly in significance, even though the value of R (.892) does not differ appreciably from the value of r between Y_{TP} and Y_{1P} (.89). This would indicate that the measures of socio-economic factors and intelligence are highly intercorrelated and presumably exert a reciprocal influence on each other.

---

[1]The value of R at the 1 per cent level of significance is .422 with three variables and 47 degrees of freedom (see Table 12).

*Datum taken from Table 14.

**Datum taken from Table 14.

[2]See Table 12 for the significant values of R and of r at the 1 per cent level.

QUESTION NINE: PARTIAL COEFFICIENTS OF CORRELATION BETWEEN EACH OF THE FIVE AREAS OF ACADEMIC ACHIEVEMENT AND PER CENT OF NONWHITES IN A COUNTY, WITH THE SOCIO-ECONOMIC INDEX AND INTELLIGENCE FOR THE WHITE POPULATION IN 67 FLORIDA COUNTIES HELD CONSTANT.

The partial r's between each of the five academic achievement variables and per cent of nonwhites in a county (with the socio-economic composite and intelligence held constant) for the white population involved in this question will be presented solely in terms of a table for the white population in Florida's sixty-seven counties.

The White Population

The partial r's between each of the five academic achievement variables (Y_{2W}, Y_{3W}, Y_{4W}, Y_{5W}, and Y_{TW}) and per cent of nonwhites in a county (X_N), with the socio-economic index (S_{TW}) and intelligence (Y_{1W}) held constant, are shown in Table 18. The partial r's involved in this question are presented below in summary form.

AREAS OF ACADEMIC ACHIEVEMENT	PARTIAL r's
English (Y_{2W})	.001
Social Studies (Y_{3W})	.026
Natural Science (Y_{4W})	-.248
Mathematics (Y_{5W})	.281
Total Academic Achievement (Y_{TW})	-.009

TABLE 18

PARTIAL r's BETWEEN FIVE ACADEMIC ACHIEVEMENT VARIABLES AND PER CENT OF NONWHITES IN A COUNTY, WITH SOCIO-ECONOMIC AND INTELLIGENCE LEVELS FOR THE WHITE POPULATION AMONG 67 FLORIDA COUNTIES HELD CONSTANT

Variables	Partial r's
$r\ Y_{2W}\ X_N \cdot S_{TW}\ Y_{1W}$	.001
$r\ Y_{3W}\ X_N \cdot S_{TW}\ Y_{1W}$	.026
$r\ Y_{4W}\ X_N \cdot S_{TW}\ Y_{1W}$	-.248
$r\ Y_{5W}\ X_N \cdot S_{TW}\ Y_{1W}$	.281
$r\ Y_{TW}\ X_N \cdot S_{TW}\ Y_{1W}$	-.009

TABLE 19

PARTIAL r's BETWEEN FIVE ACADEMIC ACHIEVEMENT VARIABLES AND THE SOCIO-ECONOMIC INDEX, WITH INTELLIGENCE LEVEL HELD CONSTANT

	English	Social Studies	Natural Science	Mathematics	Total
	Y_{2W}	Y_{3W}	Y_{4W}	Y_{5W}	Y_{TW}
White Population (Y_{1W} held constant)	.47	.35	.21	.18	.45
Nonwh	Y_{2N}	Y_{3N}	Y_{4N}	Y_{5N}	Y_{TN}
Nonwhite Population (Y_{1N} held constant)	.22	.31	.28	.19	.33
	Y_{2P}	Y_{3P}	Y_{4P}	Y_{5P}	Y_{TP}
Combined Population (Y_{1P} held constant)	.04	.28	.01	.01	.15

Analysis

The partial r's reveal that, of the five areas of academic achievement, only the value of r for mathematics (.28) appears to be significant at the 5 per cent level.[1] It should be noted, however, that the area of natural science reveals a value of -.25, indicating a negative relationship which is approaching statistical significance. The r's of .026, .001, and -.009 for the areas of English, social studies, and total achievement, respectively, are low and considered negligible.

QUESTION TEN: PARTIAL COEFFICIENTS OF CORRELATION BETWEEN EACH OF THE FIVE AREAS OF ACADEMIC ACHIEVEMENT AND THE SOCIO-ECONOMIC INDEX, WITH INTELLIGENCE LEVEL HELD CONSTANT

The partial r's between each of the five academic achievement variables and the socio-economic index (with intelligence held constant) involved in this question were computed separately for the white, nonwhite, and total population in Florida counties. The correlations for the white population will be based on an N of 67, whereas the correlations for the nonwhite and total population will be based on an N of 50.

The White Population

The partial r's between each of the five academic achievement variables (Y_{2W}, Y_{3W}, Y_{4W}, Y_{5W}, and Y_{TW}) and the socio-economic index (S_{TW}), with intelligence (Y_{1W}) held constant, are shown in Table 19.

---

[1]The value of r, according to Snedecor (2, p. 296) is .245 at the 5 per cent level of significance.

The partial r's involved in this part of question ten are presented below in summary form.

AREAS OF ACADEMIC ACHIEVEMENT	PARTIAL r's
English (Y_{2W})	.47
Social Studies (Y_{3W})	.35
Natural Science (Y_{4W})	.21
Mathematics (Y_{5W})	.18
Total Academic Achievement (Y_{TW})	.45

Analysis

In an effort to analyze more effectively the partial r's and the simple r's involved in this question, the zero-order coefficients, shown previously for the white population in Table 11, are listed below in summary form.

S_{TW}	Y_{2W} English	Y_{3W} Social Studies	Y_{4W} Natural Science	Y_{5W} Mathematics	Y_{TW} Total
Socio-Economic Composite or Total Index	.73	.68	.61	.50	.74

It is worth noting that, when intelligence is held constant, the partial r's are appreciably different from the simple r's. While the simple r's are all moderately high, the resultant partial r's appear to be approximately one-third lower than the related simple r's. English, total academic achievement, and social studies reveal statistically significant relationships at the 1 per cent level,[1] whereas natural

[1]See Table 12 for the significant values of r at the 1 and 5 per cent levels.

science and mathematics do not appear to be statistically significant at the 1 or 5 per cent level.

It may be concluded, then, that total academic achievement, English, and social studies are moderately associated with county-wide socio-economic factors. The low partial r's for natural science and mathematics indicate the possibility of a high degree of association between the intelligence level of a county and county-wide achievement in the areas of natural science and mathematics.

The Nonwhite Population

The partial r's between each of the five academic achievement variables (Y_{2N}, Y_{3N}, Y_{4N}, Y_{5N}, and Y_{TN}) and the socio-economic index (S_{TN}), with intelligence (Y_{1N}) held constant, are shown in Table 19. The partial r's involved in this part of question ten are presented below in summary form.

AREAS OF ACADEMIC ACHIEVEMENT	PARTIAL r's
English (Y_{2N})	.22
Social Studies (Y_{3N})	.31
Natural Science (Y_{4N})	.28
Mathematics (Y_{5N})	.19
Total Academic Achievement (Y_{TN})	.33

Analysis

In an effort to analyze more effectively the partial r's and the zero-order r's involved in this question, the simple r's between

the socio-economic index and academic achievement, shown previously for the nonwhite population in Table 13, are listed below in summary form.

S_{TN}	Y_{2N} English	Y_{3N} Social Studies	Y_{4N} Natural Science	Y_{5N} Mathematics	Y_{TN} Total
Socio-Economic Composite or Total Index	.44	.37	.36	.22	.48

When intelligence is held constant, the partial r's are appreciably different from the simple r's. While the simple r's show statistically significant relationships for all the variables except mathematics at the 1 per cent level,[1] the partial r's reveal statistically significant relationships for the areas of total academic achievement, social studies, and natural science at the 5 per cent level.[2] The partial r's for English and mathematics do not appear to have attained statistical significance at the 1 or 5 per cent level.

It may be seen that total academic achievement, social studies, and natural science are moderately associated with county-wide socio-economic factors. The partial r for English and the low partial r for mathematics indicate that factors other than adult schooling and family income are important contributors to county-wide achievement of high school seniors in the areas of English and mathematics.

---

[1]The value of r at the 1 per cent level of significance is .36 with 48 degrees of freedom (see Table 12).

[2]The value of r, according to Snedecor (2, p. 296) is .282 at the 5 per cent level and .365 at the 1 per cent level of significance with 47 degrees of freedom (see Table 12).

The Total Population

The partial r's between each of the five academic achievement variables (Y_{2P}, Y_{3P}, Y_{4P}, Y_{5P}, and Y_{TP}) and the socio-economic index (S_{TP}), with intelligence (Y_{1P}) held constant, are shown in Table 19. The partial r's involved in this part of question ten are presented below in summary form.

AREAS OF ACADEMIC ACHIEVEMENT	PARTIAL r's
English (Y_{2P})	.04
Social Studies (Y_{3P})	.28
Natural Science (Y_{4P})	.01
Mathematics (Y_{5P})	.01
Total Academic Achievement (Y_{TP})	.15

Analysis

Here again in an effort to analyze more effectively the partial r's and the zero-order r's involved in this question, the simple r's between the socio-economic index and academic achievement, shown previously for the total population in Table 13, are listed below in summary form.

S_{TP}	Y_{2P} English	Y_{3P} Social Studies	Y_{4P} Natural Science	Y_{5P} Mathematics	Y_{TP} Total
Socio-Economic Composite or Total Index	.70	.78	.52	.66	.75

It is notable that, when intelligence is held constant, the results are radically different from the simple r's. While the simple r's in previous tables have indicated a substantial relationship between

county-wide socio-economic factors and all of the areas of academic achievement, the present partial r's show that this relationship is largely due to the interrelated factor of intelligence.

QUESTION ELEVEN: PARTIAL COEFFICIENTS OF CORRELATION BETWEEN TOTAL ACADEMIC ACHIEVEMENT AND THE SOCIO-ECONOMIC INDEX, WITH INTELLIGENCE AND SIZE OF COUNTY HELD CONSTANT

The partial r's in this question, involving as they do the relationship between the variable of total academic achievement and the socio-economic index (with intelligence and size of county held constant), will be presented in terms of separate tables for the white, nonwhite, and total population in Florida counties. The correlations for the white population will be based on N's of 67 and 50, whereas the correlations for the nonwhite and total population will be based solely on an N of 50.

The White Population

The partial r's between total academic achievement (Y_{TW}) and the socio-economic index (S_{TW}), with intelligence (Y_{IW}) and size of county (X_{S}) held constant, are shown in Table 20. It may be seen that the partial r based on an N of 67 is .42, whereas the partial r based on an N of 50 is found to be .55.

TABLE 20

PARTIAL r's BETWEEN THE TOTAL ACADEMIC ACHIEVEMENT LEVEL OF A COUNTY AND THE SOCIO-ECONOMIC INDEX, WITH INTELLIGENCE LEVEL AND SIZE OF COUNTY HELD CONSTANT, FOR THE WHITE, NONWHITE, AND TOTAL POPULATION IN FLORIDA COUNTIES

Variables	Partial r's
White Population	
$r\ Y_{TW}\ S_{TW} \cdot Y_{1W}\ X_{\%}$	.42*
$r\ Y_{TW}\ S_{TW} \cdot Y_{1W}\ X_{\%}$	.55**
Nonwhite Population	
$r\ Y_{TN}\ S_{TN} \cdot Y_{1N}\ X_{\%}$	.24**
Total Population	
$r\ Y_{TP}\ S_{TP} \cdot Y_{1P}\ X_{\%}$	.03**

*Based on an N of 67.

**Based on an N of 50.

Analysis

Any attempt to analyze the partial r's obtained in this question must of necessity include ample consideration of the simple r's which were involved in the computation of these partial r's. The simple r's which appear to have an influence on the partial r's in this analysis were presented originally in Table 11. They are listed below in summary form.

$r_{Y_{TW}\,Y_{1W}} = .82$ $\quad r_{Y_{TW}\,S_{TW}} = .74$ $\quad r_{S_{TW}\,Y_{1W}} = .67$

$r_{S_{TW}\,X_{\%}} = .49$ $\quad r_{Y_{TW}\,X_{\%}} = .44$ $\quad r_{Y_{1W}\,X_{\%}} = .42$

The simple r's above are all statistically significant at the 1 per cent level.[1] The present partial r's of .42 and .55 indicate that, when intelligence and size of county are held constant, there is still a statistically significant relationship[2] between county-wide socio-economic index and total academic achievement level of high school seniors among the white population of the sixty-seven counties of Florida.

The Nonwhite Population

The partial r between total academic achievement (Y_{TN}) and the socio-economic index (S_{TN}), with intelligence (Y_{1N}) and size of county ($X_{\%}$) held constant, is shown in Table 20. It may be noted that the

---

[1]The value of r at the 1 per cent level of significance is .313 with 65 degrees of freedom (see Table 12).

[2]The value of r at the 1 per cent level of significance is .318 with 63 degrees of freedom (see Table 12).

value of this partial r (.24), when compared with the values in Table 12, appears to be approaching a statistically significant relationship at the 5 per cent level.[1]

Analysis

In analyzing the present partial r, it is necessary to give ample consideration to the simple r's which were involved in its computation. The simple r's which appear to have a determinantal influence on the partial r in this analysis were shown originally in Table 13. They are presented below in summary form.

$r_{S_{TN} X_{\%}} = .60$ $\quad r_{Y_{TN} S_{TN}} = .48$ $\quad r_{Y_{TN} Y_{1N}} = .47$

$r_{S_{TN} Y_{1N}} = .46$ $\quad r_{Y_{TN} X_{\%}} = .38$ $\quad r_{Y_{1N} X_{\%}} = .32$

The simple r's above are all statistically significant at the 1 or 5 per cent level.[2] The present partial r of .24 indicates that, when intelligence and size of county are held constant, the relationship between total academic achievement and the socio-economic index approaches statistical significance at the 5 per cent level. When it is realized that the measures of socio economic and academic achievement levels for the nonwhite population reveal a much lower degree of variability than do similar measures for the white population, the partial r of .24 may be interpreted as showing a significant relationship.

---

[1]The value of r at the 5 per cent level of significance is .285 with 46 degrees of freedom (see Table 12).

[2]The values of r at the 1 and 5 per cent levels of significance are .361 and .279, respectively, with 48 degrees of freedom (see Table 12).

The Total Population

The partial r between total academic achievement (Y_{TP}) and the socio-economic index (S_{TP}), with intelligence (Y_{TP}) and size of county ($X_{\%}$) held constant, is shown in Table 20. It may be noted that the value of this partial r (.03) is low and considered negligible.

Analysis

The calculation of the present partial r of .03 reveals that a variety of conditions and relationships entered into the rather sensitive mathematical equation for computing this partial r. Ample consideration should be given to the simple r's which figured prominently in the over-all calculation. The simple r's which appear to have a determinantal influence on the partial r in this analysis were presented originally in Table 14. They are listed below in summary form.

$r_{Y_{TP}\, Y_{1P}} = .89$ $\quad r_{S_{TP}\, Y_{1P}} = .80$ $\quad r_{Y_{TP}\, S_{TP}} = .75$

$r_{Y_{TP}\, X_{\%}} = .59$ $\quad r_{S_{TP}\, X_{\%}} = .57$ $\quad r_{Y_{1P}\, X_{\%}} = .50$

It would appear, then, that intelligence levels and size of counties are interactive and are virtually inseparable from the academic achievement and socio-economic levels for the total population in Florida counties.

In an effort to probe further into the relationships involved in the present partial r for the total population, an attempt was made to ascertain the relationship between total academic achievement for the nonwhites and the socio-economic index for the total population in 50 Florida counties, with size of county and intelligence for the total

population held constant. The computation of this partial r was found to be .08, which is also low and considered negligible. This exploration provided evidence which indicates that, when intelligence and size of county have been held constant, the socio-economic level for the total population is not affecting appreciably the total academic achievement of the nonwhite high school seniors in the 50 Florida counties represented in this study.

Summary

The basic data derived for the study were analyzed in this chapter. Zero-order, partial, and multiple coefficients of correlation were calculated to determine the answers to the basic questions of the study. The statistical results were presented by means of simplified tables which specifically applied to each question under consideration. Levels of confidence were determined by consulting Snedecor's (2, p. 286) tabled values of R and r at the 1 and 5 per cent levels. Some of the major relationships described in this chapter may be summarized as follows:

1. Achievement of white high school seniors in English, social studies, natural science, mathematics, and total achievement is moderately associated with the socio-economic factors of adult schooling and family income of the white population in Florida counties.

2. Achievement of nonwhite high school seniors in English, social studies, natural science, and total achievement is moderately associated with the socio-economic factors of adult schooling and family income of the nonwhite population in Florida counties.

3. Achievement of nonwhite high school seniors in mathematics is negligibly related to the socio-economic factors of adult schooling, income, and the measure of schooling and income combined.

4. The county-wide socio-economic factors of schooling and income appear to be more closely associated with achievement in English and social studies than with natural science and mathematics for the white and nonwhite population.

5. Achievement in mathematics for the nonwhite population appears to be the only measure of achievement which is negligibly related to size of county.

6. The greater the proportion of nonwhites in a county the lower the academic achievement of nonwhite high school seniors in that county.

7. The per cent of nonwhites in a county does not affect appreciably the measures of intelligence and achievement in English, social studies, natural science, mathematics, and total achievement for the white and nonwhite population in the counties of Florida.

8. When the measures of intelligence and size of county are held constant, socio-economic factors of schooling and income are still found to be significantly related to total academic achievement for the white and nonwhite population in Florida counties.

- - - - - - - - - - -

Further details concerning the findings of this chapter and a discussion of Question 12, relating to inferences which may be drawn

concerning the achievement of white and nonwhite high school seniors in Florida, will be presented in the final chapter.

Bibliography

1. Continuing Educational Council of Florida. Quality in Florida's Public Schools. Tallahassee, Florida: The Council, 1959. (Mimeographed.)

2. Snedecor, George W. Statistical Methods: Applied to Experiments in Agriculture and Biology. Third edition. Ames, Iowa: Iowa State College Press, 1940.

CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

An investigation was made in this study of the relationships between county-wide measures of certain socio-economic factors, intelligence, and academic achievement of high school seniors in Florida. Including virtually all of the white and nonwhite public and private high schools of the state of Florida, this study represents an analysis of 120,130 test scores made by 24,026 seniors who were participants in the Florida State-Wide Twelfth-Grade Testing Program during the years 1956 and 1957. Two-hundred thirteen white high schools and thirty-two white private high schools, represented by the test scores of 19,749 seniors, were included in the study. Eighty-six nonwhite high schools and one nonwhite private high school, represented by the test scores of 4,277 seniors, were also included in the study. Each of the sixty-seven county school administrative units of Florida is represented in the study. In the case of the nonwhite high schools, insufficient or inadequate data made it necessary to omit 17 counties from portions of the study.

Measures of county-wide socio-economic, intelligence, and academic-achievement levels were developed for the white, nonwhite, and total population of each county represented in the study. Quantified census data relating to the median years of school completed by

persons 25 years old and over and median fannual family income were used in the development of measures of socio-economic levels for the counties represented in the study. The measures of county-wide intelligence and academic achievement levels were developed from the individual test scores made by thos high school seniors who participated in the Florida State-Wide Twelfth-Grade Testing Program. Median raw scores were computed from county-wide frequency distributions of test scores in the area of intelligence and in the subject-matter areas of English, social studies, natural science, and mathematics. To avoid giving undue weight to the different tests involving aspects of academic achievement, all county-wide median raw scores were converted to comparable scaled scores. Once the median raw scores had been converted to comparable scaled scores, it was possible to obtain an over-all total academic achievement scaled score for each county represented in the study. In the absence of comparable scaled scores for the intelligence portion of the test battery, the original raw scores of the intelligence test were given a mean and standard deviation comparable to those of the achievement test scores. Since the Florida achievement scores were scaled with reference to national norms, the procedure used produced a set of county median intelligence scores comparable both to the county median achievement scores and the national norms.

The basic techniques for making the statistical analyses were as follows: The transforming of income and levels of schooling figures into T-values, the transforming of median raw intelligence scores and academic achievement scores into comparable scaled scores, the computation

of simple (Pearson Product-Moment) correlations among all the variables in the study, the computation of partial and multiple correlations in terms of those variables which were found to be critical factors in arriving at answers to the twelve basic questions in the study, and the testing of the significance of the calculated correlations by the use of Snedecor's (7, p. 286) tabled values of R and r at the 1 and 5 per cent levels. The statistical design involved the following major computations:

1. Normalizing quantified census data relating to county-wide levels of schooling and income, including a measure of schooling and income combined, by transforming the original data into T-values.

2. Transforming county-wide median raw test scores of high school seniors on the Florida State-Wide Twelfth-Grade Testing Program into normalized, comparable scaled scores.

3. Calculating the zero-order, partial, and multiple coefficients of correlation required to answer the basic questions in the study.

Quantified census data were used in the development of the measures of the socio-economic level for the white, nonwhite, and total population of each county included in the study. The census data which were used in determining the socio-economic level of each county comprised a 20 per cent sample of the adult population throughout each county in Florida represented in the study.

Statistical Relationships Involved in the Basic Questions of the Study

The basic data derived for this study were analyzed by means of statistical formulae. Answers were obtained to the basic questions of

the study and conclusions reached concerning their related hypotheses. Levels of confidence were determined by consulting Snedecor's (7, p. 286) tabled values of R and r at the 1 and 5 per cent levels (see Table 12). The statistical results are summarized in terms of simplified tables which specifically apply to each question under consideration. The last question, involving as it does the findings of the previous questions, will be treated as an interpretive question, the explanation being provided in terms of the over-all findings of pertinent related research and the statistical results of this study.

RELATIONSHIP BETWEEN SOCIO-ECONOMIC FACTORS AND ACADEMIC ACHIEVEMENT (QUESTION 1)*

A. White Population.--The zero-order correlations between each of the socio-economic factors and the academic achievement variables are listed below.

	Y_{2W} English	Y_{3W} Social Studies	Y_{4W} Natural Science	Y_{5W} Mathematics	Y_{TW} Total
S_{1W} Schooling	.71	.65	.64	.50	.73
S_{2W} Income	.62	.60	.49	.42	.63
S_{TW} Combined	.73	.68	.61	.50	.74

*The questions are stated in detail in Chapters I and IV.

There is a statistically significant relationship between each of the three socio-economic factors and the five academic achievement variables.

B. Nonwhite Population.--The zero-order coefficients of correlation between each of the socio-economic factors and academic achievement are listed below.

	Y_{2N} English	Y_{3N} Social Studies	Y_{4N} Natural Science	Y_{5N} Mathematics	Y_{TN} Total
S_{1N} Schooling	.33	.25	.31	.15	.36
S_{2N} Income	.46	.42	.32	.25	.51
S_{TN} Combined	.44	.37	.36	.22	.48

There is a statistically significant relationship between schooling and total academic achievement, English, and natural science. Social studies appears to be approaching statistical significance at the 5 per cent level, whereas the relationship between schooling and mathematics is not statistically significant at the 1 or 5 per cent level.

There is a statistically significant relationship between income and total academic achievement, English, social studies, and natural science. Mathematics appears to be approaching statistical significance at the 5 per cent level.

There is a statistically significant relationship between the measure of schooling and income combined and total academic achievement,

English, social studies, and natural science. It may be seen that the r between the combined socio-economic measure and mathematics does not meet the test of statistical significance at the 1 or 5 per cent level.

C. Total Population.--The zero-order coefficients of correlation between each of the socio-economic factors and the academic achievement variables are listed below.

	Y_{2P} English	Y_{3P} Social Studies	Y_{4P} Natural Science	Y_{5P} Mathematics	Y_{TP} Total
S_{1P} Schooling	.65	.76	.48	.62	.71
S_{2P} Income	.67	.71	.50	.62	.70
S_{TP} Combined	.70	.78	.52	.66	.75

There is a statistically significant relationship between each of the three socio-economic factors and the five academic achievement variables.

Analysis

The r's calculated for the white population tend to indicate that county-wide socio-economic factors of median years of school completed by adults and median annual family income are associated with the academic achievement of the white high school seniors in the counties of Florida. This association appears to be greater in English and social studies than it is in natural science and mathematics. Apparently achievement in natural science and mathematics is more a result of formal instruction at school than it is a matter of home and county-wide environmental associations and influences.

The r's calculated for the nonwhite population indicate an interesting shift from the results for the white population. Whereas schooling was the strong influential factor for the whites, the important variable for the nonwhites becomes the income of the nonwhite families. Like the whites, however, the lowest relationships involve the variables of natural science and mathematics. It is possible that achievement of nonwhite pupils in natural science and mathematics is more closely associated with such factors as formal school instruction,* peer associations at school, and other factors than it is with county-wide economic and cultural influences.

The r's calculated for the total population indicate that Florida counties reflect the pressures and strengths of the cultural environments in which their high school seniors grow up, interact, and learn. The evidence indicates that the measures of socio-economic level employed in this study are more closely associated with achievement of high school seniors in social studies and English than they are with mathematics and natural science.

Hypothesis 1, that there is no significant relationship between each of the measures of socio-economic level and the academic achievement variables used in this study, is rejected except for the relationship between each of the measures of socio-economic level and achievement in mathematics for the nonwhite population.

---

*Two or more years of science and mathematics are required for graduation in most nonwhite high schools in Florida (2, p. 13).

RELATIONSHIP BETWEEN SOCIO-ECONOMIC

FACTORS AND INTELLIGENCE (QUESTION 2)

A. White Population.--The zero-order coefficients of correlation between each of the socio-economic factors and intelligence are listed below.

	Y_{1W} Intelligence
S_{1W} Schooling. .	.69
S_{2W} Income . . .	.55
S_{TW} Combined . .	.67

There is a statistically significant relationship between each of the socio-economic factors and intelligence.

B. Nonwhite Population.--The zero-order coefficients of correlation between each of the socio-economic factors and intelligence are listed below.

	Y_{1N} Intelligence
S_{1N} Schooling. .	.38
S_{2N} Income . . .	.45
S_{TN} Combined . .	.46

There is a statistically significant relationship between each of the socio-economic factors and intelligence.

C. Total Population.--The zero-order coefficients of correlation between each of the socio-economic factors and intelligence are listed below.

	Y_{1P}
	Intelligence
S_{1P} Schooling. .	.80
S_{2P} Income . . .	.70
S_{TP} Combined . .	.80

There is a highly significant statistical relationship between each of the socio-economic factors and intelligence.

Analysis

The r's calculated for the white population indicate a high degree of association between intelligence and the socio-economic factors of median years of school completed by adults, median annual family income, and the measure of schooling and income combined. The evidence indicates that intelligence, schooling, and family income are all intercorrelated and presumably exert a reciprocal influence on each other. It is quite possible that high levels of schooling and intelligence are powerful contributors to the development of high income and social status levels among the counties of Florida.

The r's calculated for the nonwhite population are notably lower than those which were computed for the white population in this question. These lower correlations may be attributed to the measures of socio-economic factors and intelligence which reveal less variability than do similar measures for the white and total population. The evidence does indicate, however, that nonwhite income levels are more highly associated with intelligence than are levels of schooling. This is perhaps

one way of explaining why nonwhite high school seniors in general perform better academically in those counties in which the income level for nonwhites is high.

The r's calculated for the total population are all high and indicate that county-wide levels of schooling are more closely associated with intelligence than are county-wide levels of income. Too, since they are highly interrelated, the measures of schooling, income, and intelligence presumably exert a reciprocal influence on each other.

Hypothesis 2, that there is no significant relationship between each of the measures of socio-economic level and the measure of intelligence used in this study, is rejected, the evidence indicating that all relationships involved in question two were found to be statistically significant at the 1 per cent level.

RELATIONSHIP BETWEEN INTELLIGENCE AND ACADEMIC ACHIEVEMENT (QUESTION 3)

A. White Population.--The zero-order coefficients of correlation between intelligence and the five academic achievement variables are listed below.

Y_{1W}	Y_{2W} English	Y_{3W} Social Studies	Y_{4W} Natural Science	Y_{5W} Mathematics	Y_{TW} Total
Intelligence	.73	.76	.76	.58	.82

There is a highly significant statistical relationship between intelligence and the five academic achievement variables.

B. Nonwhite Population.--The zero-order coefficients of correlation between intelligence and the five academic achievement variables are listed below.

	Y_{1N}	Y_{2N} English	Y_{3N} Social Studies	Y_{4N} Natural Science	Y_{5N} Mathematics	Y_{TN} Total
Intelligence		.62	.21	.26	.10	.47

There is a statistically significant relationship between intelligence and achievement in English and total academic achievement at the 5 per cent level. Natural science appears to be approaching statistical significance at the 5 per cent level, whereas the relationships between intelligence and the variables of social studies and mathematics are not statistically significant at the 1 or 5 per cent level.

C. Total Population.--The zero-order coefficients of correlation between intelligence and the five academic achievement variables are listed below.

	Y_{1P}	Y_{2P} English	Y_{3P} Social Studies	Y_{4P} Natural Science	Y_{5P} Mathematics	Y_{TP} Total
Intelligence		.86	.88	.65	.82	.89

There is a very significant statistical relationship between intelligence and the five academic achievement variables.

Analysis

The r's calculated for the white population point to a powerful association between the intelligence level and academic achievement

levels of Florida counties. It is worth noting that the highest correlation with intelligence is with total academic achievement, whereas the lowest correlation is found to be with mathematics. Due to the high degree of association between county-wide intelligence and academic achievement levels, these relationships were subjected to further investigation, the results of which are reported in subsequent material.

The r's for the nonwhite population, when compared with similar relationships for the white population, appear to be strikingly low. The correlation between intelligence and total academic achievement is .35 below the figure for the white population. The r of .62 for English for the nonwhite population approaches the r of .73 for English for the white population more closely than for any of the other measures of achievement. The remaining r's for total achievement, natural science, social studies, and mathematics are approximately one-third or one-fourth of those similar relationships for the white population. It is quite probable that the low r's are the result of a rather restricted range of variability in the achievement levels of nonwhite high school seniors.

The r's calculated for the total population re-emphasize the correlative aspects of county-wide intelligence and academic achievement levels. They also highlight the marked differences in academic achievement which are associated with the levels of intelligence for the white and nonwhite segments of the population in Florida counties. Some of these differences have been subjected to further investigation the results of which are reported in subsequent material.

Hypothesis 3, that there is no significant relationship between the measure of intelligence and each of the academic achievement variables used in this study, is rejected except for the relationship between the measure of intelligence and achievement in mathematics, social studies, and possibly natural science for the nonwhite population.

RELATIONSHIP BETWEEN SIZE OF COUNTY AND ACADEMIC ACHIEVEMENT (QUESTION 4)

A. White Population.--The zero-order coefficients of correlation between size of county and the five academic achievement variables are listed below.

$X_{\%}$	Y_{2W} English	Y_{3W} Social Studies	Y_{4W} Natural Science	Y_{5W} Mathematics	Y_{TW} Total
Size of County	.43	.40	.33	.35	.44

There is a statistically significant relationship between the size of a county and the five academic achievement variables.

B. Nonwhite Population.--The zero-order coefficients of correlation between size of county and the five academic achievement variables are listed below.

$X_{\%}$	Y_{2N} English	Y_{3N} Social Studies	Y_{4N} Natural Science	Y_{5N} Mathematics	Y_{TN} Total
Size of County	.33	.32	.33	.04	.38

There is a statistically significant relationship between size of county and total academic achievement at the 1 per cent level, followed by statistically significant relationships with English, natural science, and social studies at the 5 per cent level. Mathematics appears to be negligibly related to a size of county.

C. Total Population.--The zero-order coefficients of correlation between size of county and the five academic achievement variables are listed below.

$X_{\%}$	Y_{2P} English	Y_{3P} Social Studies	Y_{4P} Natural Science	Y_{5P} Mathematics	Y_{TP} Total
Size of County	.55	.63	.41	.48	.59

There is a statistically significant relationship between size of county and the five academic achievement variables.

Analysis

The r's calculated for the white population indicate that size of county is positively associated with the over-all academic achievement which characterizes Florida counties. This relationship between size of county and academic achievement has been subjected to further investigation, the results of which are reported in subsequent material.

The r's calculated for the nonwhite population compare favorably with those found for the white population, with the sole exception of mathematics. For some reason or other, mathematics drops to insignificance for the nonwhite population. This finding suggests the

possibility that achievement in mathematics is perhaps more closely associated with the quality of teaching in certain counties, the fact that two or more years of mathematics are required for graduation in most nonwhite high schools in Florida, and many other factors. Investigations should be made to determine what some of these influential factors are.

The r's for the total population re-emphasize the high degree of association between size of county and the over-all academic achievement which characterizes the counties of Florida. This association has been subjected to further investigation, the results of which are reported in subsequent material.

Hypothesis 4, that there is no significant relationship between size of county and the five academic achievement variables used in this study, is rejected except for the relationship between size of county and achievement in mathematics for the nonwhite population.

RELATIONSHIP BETWEEN PER CENT OF NONWHITES IN A COUNTY AND ACADEMIC ACHIEVEMENT (QUESTION 5)

A. White Population.--The zero-order coefficients of correlation between the demographic factor of per cent of nonwhites in a county and the five academic achievement variables are listed below.

X_N	Y_{2W} English	Y_{3W} Social Studies	Y_{4W} Natural Science	Y_{5W} Mathematics	Y_{TW} Total
Per Cent of County That Is Nonwhite	.06	.05	-.14	.18	.04

The values of r between per cent of county that is nonwhite and academic achievement indicate that the per cent of nonwhites in a county is more or less negligibly related to all five of the academic achievement variables.

B. Nonwhite Population.--The zero-order coefficients of correlation between per cent of nonwhites in a county and the five academic achievement variables are listed below.

X_N	Y_{2N} English	Y_{3N} Social Studies	Y_{4N} Natural Science	Y_{5N} Mathematics	Y_{TN} Total
Per Cent of County That Is Nonwhite	-.13	-.19	-.21	-.19	-.21

The values of r between per cent of county that is nonwhite and academic achievement point out that all of the relationships are virtually negligible.

C. Total Population.--The zero-order coefficients of correlation between per cent of nonwhites in a county and the five academic achievement variables are listed below.

X_N	Y_{2P} English	Y_{3P} Social Studies	Y_{4P} Natural Science	Y_{5P} Mathematics	Y_{TP} Total
Per Cent of County That Is Nonwhite	-.23	-.31	-.25	-.22	-.28

There is a significant negative relationship between per cent of a county that is nonwhite and achievement in social studies and total academic achievement at the 5 per cent level. Natural science, English,

and mathematics appear to be approaching a significant negative relationship with per cent of county that is nonwhite at the 5 per cent level.

Analysis

The r's calculated for the white population provide every indication that, while per cent of nonwhites in a county is negligibly related to each of the five academic achievement variables, mathematics and natural science are associated with per cent of county that is nonwhite in a way which is somewhat different from the other academic achievement variables.

The r's calculated for the nonwhite population are all virtually negligible. There is some indication that, if there were more variation among counties in the per cent of nonwhites, the correlations might be still larger in a negative direction.

The r's calculated for the total population point out that, when the test scores of white and nonwhite high school seniors are combined for each county, the r between per cent of each county that is nonwhite and county-wide academic achievement is still negative, but it is larger in a negative direction. Apparently factors other than per cent of nonwhites are largely influential in determining the academic achievement levels of high school seniors in the counties of Florida.

Hypothesis 5, that there is no significant relationship between per cent of nonwhites in a county and the measures of academic achievement used in the study, is accepted, the evidence being more than sufficient.

RELATIONSHIP BETWEEN SIZE OF COUNTY AND ACADEMIC ACHIEVEMENT, WITH INTELLIGENCE HELD CONSTANT (QUESTION 6)

A. White Population.--The partial coefficients of correlation between size of county and academic achievement, with intelligence held constant, are listed below.

$$r\, X_{\%}\, Y_{2W} \cdot Y_{1W} = .23$$
$$r\, X_{\%}\, Y_{TW} \cdot Y_{1W} = .20$$
$$r\, X_{\%}\, Y_{3W} \cdot Y_{1W} = .18$$
$$r\, X_{\%}\, Y_{5W} \cdot Y_{1W} = .13$$
$$r\, X_{\%}\, Y_{4W} \cdot Y_{1W} = .01$$

The partial r's for the white population indicate that English ranks first among the academic achievement variables and appears to be approaching statistical significance at the 5 per cent level, followed by total academic achievement and social studies which also appear to be approaching significance at the 5 per cent level. Mathematics and natural science, with partial r's of .13 and .01 respectively, are considered negligible.

B. Nonwhite Population.--The partial coefficients of correlation between size of county and academic achievement, with intelligence held constant, are listed below.

$$r\, X_{\%}\, Y_{TN} \cdot Y_{1N} = .28$$
$$r\, X_{\%}\, Y_{4N} \cdot Y_{1N} = .27$$
$$r\, X_{\%}\, Y_{3N} \cdot Y_{1N} = .27$$
$$r\, X_{\%}\, Y_{2N} \cdot Y_{1N} = .18$$
$$r\, X_{\%}\, Y_{5N} \cdot Y_{1N} = .01$$

The partial r's for the nonwhite population indicate that total academic achievement is significantly related to size of county at the 5 per cent level, followed by social studies and natural science which appear to be approaching significance at the 5 per cent level. The partial r's for English and mathematics are low and considered negligible.

C. Total Population.--The partial coefficients of correlation between size of county and academic achievement, with intelligence held constant, are listed below.

$$r\, X_{\not\subset} Y_{3P} \cdot Y_{1P} = .46$$
$$r\, X_{\not\subset} Y_{TP} \cdot Y_{1P} = .35$$
$$r\, X_{\not\subset} Y_{2P} \cdot Y_{1P} = .27$$
$$r\, X_{\not\subset} Y_{5P} \cdot Y_{1P} = .14$$
$$r\, X_{\not\subset} Y_{4P} \cdot Y_{1P} = .12$$

The partial r's above reveal that social studies is significantly related to size of county at the 1 per cent level. Total academic achievement appears to be approaching significance at the 1 per cent level, whereas English may be said to be approaching significance at the 5 per cent level. The partial r's for mathematics and natural science are low and considered negligible.

Analysis

The partial r's for the white population indicate that size of county apparently contributes more to achievement in English, total academic achievement, and social studies than it does to mathematics and natural science. The wide variation in the partial r's among the

areas of academic achievement, however, suggests that many factors other than size of county are strong contributors to achievement.

The partial r's for the nonwhite population indicate that size of county is associated to a lesser degree with English and mathematics than it is with total academic achievement, social studies, and natural science.

The partial r's for the total population indicate that size of county is associated with social studies, total academic achievement, and English to a greater degree than it is with mathematics and natural science.

Hypothesis 6, when the measure of intelligence is held constant, there are no significant relationships between size of county and the measures of academic achievement used in this study, is accepted for the white population; it is accepted for English and mathematics for the nonwhite population; and mathematics and natural science for the total population.

RELATIONSHIP BETWEEN INTELLIGENCE AND ACADEMIC ACHIEVEMENT, WITH PER CENT OF NONWHITES IN THE COUNTY HELD CONSTANT (QUESTION 7)

A. White Population.--The partial coefficients of correlation between intelligence and academic achievement, with per cent of nonwhites in a county held constant, are listed below.

$$r\ Y_{1W}\ Y_{TW} \cdot X_N = .83$$

$$r\ Y_{1W}\ Y_{4W} \cdot X_N = .80$$

$$r\ Y_{1W}\ Y_{3W} \cdot X_N = .75$$

$$r\ Y_{1W}\ Y_{2W} \cdot X_N = .74$$

$$r\ Y_{1W}\ Y_{5W} \cdot X_N = .65$$

Analysis

The partial r's and the simple r's involved in this question, while revealing statistically significant relationships for all variables at the 1 per cent level, are not appreciably different. This would lend support to the earlier finding that the per cent of nonwhites in a county does not seriously affect the relationship between the measure of intelligence and all the measures of academic achievement of the white high school seniors throughout the counties of Florida.

Hypothesis 7, when the per cent of nonwhites in a county is held constant, there are no significant relationships between the measures of academic achievement and the measure of intelligence used in this study, is rejected for the white population. The evidence revealed in this question is more than adequate to reject this hypothesis.

RELATIONSHIP BETWEEN TOTAL ACADEMIC ACHIEVEMENT AND THE COMBINED INFLUENCES OF THE SOCIO-ECONOMIC INDEX AND INTELLIGENCE (QUESTION 8)

A. White Population.--The multiple R between total academic achievement and the combined influences of the socio-economic index and the measure of intelligence reveals a value of .86. This value of R,

when compared with the simple r's for total achievement and the socio-economic index (.73) and total achievement and the measure of intelligence (.82), may be said to indicate that the measures of intelligence and the combined socio-economic factors are highly associated with the over-all academic achievement level of the counties represented in the study.

B. Nonwhite Population.--The multiple R between total academic achievement and the combined influences of the socio-economic index and the measure of intelligence reveals a value of .57. This value of R, when compared with the simple r's for total achievement and the socio-economic index (.48) and total achievement and the measure of intelligence (.47), may be said to indicate that the measures of intelligence and the combined socio-economic factors are highly associated with the over-all academic achievement level of the counties represented in this study.

C. Total Population.--The multiple R between total academic achievement and the combined influences of the socio-economic index and the measure of intelligence reveals a value of .892. This value of R, when compared with the simple r's for total academic achievement and the socio-economic index (.75) and total academic achievement and the measure of intelligence (.89), appears to have increased slightly. This would indicate that the socio-economic index and the measure of intelligence are highly interrelated and presumably exert a reciprocal influence on each other.

Hypothesis 8, that there is no significant relationship between the measure of total academic achievement and the combined influences of the socio-economic index and the measure of intelligence, is rejected.

RELATIONSHIP BETWEEN ACADEMIC ACHIEVEMENT AND PER CENT OF NONWHITES IN A COUNTY, WITH THE SOCIO-ECONOMIC INDEX AND INTELLIGENCE HELD CONSTANT (QUESTION 9)

A. White Population.--The partial coefficients of correlation between the academic achievement variables and the per cent of nonwhites in a county, with the socio-economic index and the measure of intelligence held constant, are listed below.

MEASURES OF ACADEMIC ACHIEVEMENT	PARTIAL r's
English (Y_{2W})	.001
Social Studies (Y_{3W})	.026
Natural Science (Y_{4W})	-.248
Mathematics (Y_{5W})	.281
Total Academic Achievement (Y_{TW})	-.009

Analysis

The partial r's in this question reveal that the value of r for mathematics (.281) is the only relationship which appears to be statistically significant at the 5 per cent level. The r of -.248 for natural science reveals a negative relationship which is approaching statistical significance. The r's of .026, .001, and -.009 for English, social studies, and total achievement, respectively, are low and considered negligible.

Hypothesis 9, when the socio-economic index and the measure of intelligence for the white population in a county are held constant, there is no significant relationship between achievement in English,

social studies, natural science, mathematics, and total achievement and the per cent of nonwhites residing in that county, is accepted except for achievement in mathematics.

RELATIONSHIP BETWEEN ACADEMIC ACHIEVEMENT AND THE SOCIO-ECONOMIC INDEX, WITH INTELLIGENCE HELD CONSTANT (QUESTION 10)

A. White Population.--The partial r's between the academic achievement variables and the socio-economic index, with the measure of intelligence held constant, are listed below.

MEASURES OF ACADEMIC ACHIEVEMENT	PARTIAL r's
English (Y_{2W})	.47
Social Studies (Y_{3W})	.35
Natural Science (Y_{4W})	.21
Mathematics (Y_{5W})	.18
Total Academic Achievement	.45

The partial r's for the white population point to statistically significant relationships for English, social studies, and total achievement, whereas natural science and mathematics do not meet the test of statistical significance at the 1 or 5 per cent level.

B. Nonwhite Population.--The partial r's between the academic achievement variables and the socio-economic index, with the measure of intelligence held constant, are listed below.

MEASURES OF ACADEMIC ACHIEVEMENT	PARTIAL r's
English (Y_{2N})	.22
Social Studies (Y_{3N})	.31
Natural Science (Y_{4N})	.28
Mathematics (Y_{5N})	.19
Total Academic Achievement	.33

The partial r's for the nonwhite population indicate that total achievement, social studies, and natural science are significantly related to the socio-economic index, whereas English and mathematics do not appear to meet the test of statistical significance at the 1 or 5 per cent level.

C. Total Population.--The partial r's between the academic achievement variables and the socio-economic index, with the measure of intelligence held constant, are listed below.

MEASURES OF ACADEMIC ACHIEVEMENT	PARTIAL r's
English (Y_{2P})	.04
Social Studies (Y_{3P})	.28
Natural Science (Y_{4P})	.01
Mathematics (Y_{5P})	.01
Total Academic Achievement	.15

The partial r's for the total population indicate that achievement in social studies is the sole measure which is significantly related to the socio-economic index. Total achievement, English, natural science, and mathematics appear to be negligibly related to the socio-economic index.

Analysis

The partial r's calculated for the white population indicate that, when the measure of intelligence is held constant the resultant r's are about one-third lower than the related zero-order relationships. It may be concluded, then, that the measures of total achievement, English, and social studies are moderately related to the over-all measure of county-wide socio-economic level used in this study.

The partial r's for the nonwhite population indicate that, when the measure of intelligence is held constant, the resultant r's are about one-half to one-third lower in total achievement and English, and slightly reduced in social studies, natural science, and mathematics in comparison with their zero-order relationships. The partial r's for English and mathematics indicate that factors other than those included in the socio-economic index are important contributors to county-wide achievement of nonwhite high school seniors in English and mathematics.

The partial r's for the total population indicate that, when the measure of intelligence is held constant, the resultant r's for total achievement, English, natural science, and mathematics are reduced drastically from their related zero-order relationships. Only the measure of achievement in social studies appears to remain significantly related to the socio-economic index. It is quite apparent, then, that the relationships indicated by the partial r's are largely influenced by the measure of intelligence.

Hypothesis 10, when the measure of intelligence of a county is held constant, achievement in English, social studies, natural science, mathematics, and total achievement are not significantly related to the socio-economic index for that county, is rejected except for the relationship between achievement in natural science and mathematics for the white population; English and mathematics for the nonwhite population; and total achievement, English, natural science, and mathematics for the total population.

RELATIONSHIP BETWEEN TOTAL ACADEMIC ACHIEVEMENT AND THE SOCIO-ECONOMIC INDEX, WITH INTELLIGENCE AND SIZE OF COUNTY HELD CONSTANT (QUESTION 11)

A. White Population.--The partial coefficients of correlation based on N's of 67 and 50, respectively, between the measure of total academic achievement and the socio-economic index, with the measure of intelligence and size of county held constant, are presented below.

$$r\ Y_{TW}\ S_{TW} \cdot Y_{1W}\ X_{\%} = .42$$

$$r\ Y_{TW}\ S_{TW} \cdot Y_{1W}\ X_{\%} = .55$$

The partial r's of .42 and .55 indicate that, when the measure of intelligence and size of county are held constant, there is still a moderate degree of association between total achievement and the socio-economic index.

B. Nonwhite Population.--The partial coefficient of correlation based on an N of 50 between total academic achievement and the socio-economic index, with the measure of intelligence and size of county held constant, is listed below.

$$r\ Y_{TN}\ S_{TN} \cdot Y_{1N}\ X_{\%} = .24$$

The partial r of .24 appears to be approaching a statistically significant relationship with total achievement and the socio-economic index at the 5 per cent level.

C. Total Population.--The partial coefficient of correlation based on an N of 50 between total academic achievement and the socio-economic index, with the measure of intelligence and size of county held constant, is listed below.

$$r\ Y_{TP}\ S_{TP} \cdot Y_{1P}\ X_{\%} = .03$$

The partial r of .03 indicates that total achievement and the socio-economic index are more or less negligibly related.

Analysis

The partial r's for the white population provide evidence that, when the measure of intelligence and size of county are held constant, there is still a statistically significant relationship between the socio-economic level of a county and total academic achievement in that county.

The partial r for the nonwhite population provides sufficient evidence that, when the measure of intelligence and size of county are held constant, there is some indication of the presence of a statistically significant relationship between the socio-economic level of a county and total academic achievement in that county.

The partial r for the total population indicates that, when the measure of intelligence and size of county are held constant, the

relationship between the measure of total academic achievement and the socio-economic index becomes virtually negligible.

The major hypothesis of this disseration, that there is no significant relationship between the socio-economic level of a county and the median academic achievement level of high school seniors in that county, is rejected for the white population and the nonwhite population. The major hypothesis is accepted for the total population only.

Conclusions

The purpose in this dissertation has been to find information concerning the affective relationship between certain measures of the character of the county and the academic achievement level of the high school seniors within the county who participated in the Florida State-Wide Twelfth-Grade Testing Program. The following assumptions seem to be fundamental to an understanding of the results of this study:

1. That virtually all human learning occurs in a culturally influenced, if not culturally created environment.

2. That the affective environment for an individual or group is unique even though all the elements of the affective environment are included in the measure of the total environment.

3. That what constitutes an affective environment is different for the white population and the nonwhite population in Florida counties.

4. That certain factors in the economic and cultural environment of both the white population and the nonwhite population in Florida counties, while alike in many respects, rest more strongly on the beliefs, customs, and practices of the dominant white population.

In light of the preceding assumptions, the major findings of this study are summarized as follows:

1. County-wide socio-economic factors of median years of school completed by adults and median annual family income for the white population in Florida counties are moderately associated with achievement in English, social studies, natural science, mathematics, and total achievement for the white high school seniors in the counties of Florida.

2. County-wide socio-economic factors of median years of school completed by adults and median annual family income for the nonwhite population in Florida counties are moderately associated with achievement in English, social studies, natural science, and total achievement for the nonwhite high school seniors in the counties of Florida.

3. County-wide socio-economic factors of median years of school completed by adults and median annual family income appear to be more closely associated with achievement in English and social studies than with natural science and mathematics for the white and the nonwhite population in Florida counties.

4. The measure of schooling appears to be more closely associated with the over-all achievement of white high school seniors, whereas the measure of income appears to be more closely associated with over-all achievement of nonwhite high school seniors.

5. The relationship between intelligence and achievement in English for the nonwhite high school seniors approaches the relationship between the measure of intelligence and English for the white high school seniors more closely than for any other measure of achievement.

6. The only negligible relationship with size of county is the measure of achievement in mathematics for the nonwhite population.

7. The per cent of nonwhites in a county does not affect appreciably the achievement of white high school seniors in Florida.

8. The greater the proportion of nonwhites in a county, the lower the academic achievement of the nonwhite high school seniors in that county.

9. When the measure of intelligence is held constant, the lowest relationship between size of county and academic achievement is with mathematics for the white, nonwhite, and total population.

10. The per cent of nonwhites in a county does not affect appreciably the relationship between the measure of intelligence and achievement in English, social studies, natural science, mathematics, and total achievement in the counties of Florida.

11. The measures of intelligence and socio-economic level are highly interrelated and presumably exert a reciprocal influence on each other.

12. When the socio-economic index and the measure of intelligence for the white population in a county have been held constant, the only measure of achievement that appears to be significantly related to the per cent of nonwhites in a county is mathematics.

13. The lowest relationship between the socio-economic measures and academic achievement, with intelligence held constant, is with mathematics.

14. When the measures of intelligence and size of county are held constant, a statistically significant relationship persists between

the measure of socio-economic level and total academic achievement for the white and nonwhite population.

The summarization of the major statistical results of this study provides evidence for considering the final question of this study. Question 12, the final question, will be analyzed in terms of pertinent related research and the specific findings of this study. This question reads as follows:

> "What inferences may be made concerning the variations found in the median measures of certain traits of whites and nonwhites throughout the counties represented in this study? In other words, can the county-wide median academic achievement levels of white and nonwhite high school seniors be fully understood without taking into consideration other factors? What are some of the factors which may contribute to the differences between white and nonwhite medians?"

The evidence is accumulating that influences, other than academic aptitude, powerfully affect county-wide school achievement in Florida counties. While it is recognized that some of these influences are highly personal and unique in the life of each learner, others are social and cultural in nature reflecting the pressures and strengths of the environment in which the individual grows up, interacts, and learns. This was indicated in a report of the Florida Citizens Committee which stated that pupils in the more wealthy counties of Florida "have...better background and opportunities"(5, p. 58). Maller, in a study of the school progress of children in 270 neighborhoods in New York City, concluded that "educational achievement cannot be considered in isolation from the correlated psychological, social, and biological factors in the school's environment"(4, p. 670). Mort and

Cornell (6, pp. 109-124) found that, next to expenditure, the type of community and the size of the school were most closely associated with the educational quality of a school's program. Bullock, after studying the achievement of whites and Negroes, concluded that some of the differences between white and Negro students "may be attributed not only to the differential provision for the education of white and Negro pupils, but also to differences in their respective ways of life" (1, pp. 181-182).

The importance of intelligence has not been overlooked. The findings of this study are in close agreement with Stoddard's statement that heredity and environment are "close-coupled factors whose impingement is mutually interacting" (8, p. 322). Lorimer and Osborn, re-enforcing the view of Stoddard, have stated that:

> ..."intelligence," as measured by mental tests, is... determined in part by hereditary physical factors and in part by the habits of life of the family and the community in which the individual has been brought up (3, pp. 113-114).

It has been shown in this study that intelligence, as it is measured by the test used, is probably a function of both inherited traits and the socio-economic background or cultural environment. It has been observed that children with equivalent cultural environments vary considerably in intelligence, as measured by standard mental tests. In fact, children within the same family vary considerably in aptitude as measured by standard mental tests. It is not known how much each of these factors contributes to the intelligence score made by individuals on these tests.

Similarly, the evidence shows that the achievement scores made by those high school seniors who participated in the Florida State-Wide

Twelfth-Grade Testing Program are undoubtedly affected by the cultural environment in which each lives, learns, and interacts. It is not known how much each of these factors contributes to the over-all academic achievement of a county, as measured by a median score of the group-achievement tests. Undoubtedly the nonwhite population in each county varies in inherited aptitude in the same way that the white population varies in inherited aptitude. Undoubtedly the academic achievement of the nonwhite population is affected by their cultural environment as is the academic achievement of the white population. Consistently, in all the counties included in this study, the cultural level of the nonwhite population was lower, as measured by certain socio-economic factors, than for the white population. It is reasonable to conclude, therefore, that the limitations of the cultural environment of the nonwhite high school seniors is reflected in lower intelligence and academic achievement scores. It should not be inferred that all the differences found in the achievement of the nonwhite population, as compared with the white population, are due to the differences in inherited aptitude. If the cultural environment of the nonwhite population is raised substantially in the future, it is reasonable to anticipate a rise in the level of their academic achievement and a reduction in the differentials in the achievement levels of the two groups. Since the intelligence scores, as measured by group-intelligence tests, are partly a function of the cultural environment, a rise in the level of the cultural environment will probably be accompanied by a rise in the intelligence scores for the nonwhite population.

The broadening of the educational and economic opportunities available to the nonwhite population will produce a rise in the cultural level of the nonwhite population. This improvement in cultural level and standard of living has been in progress for a number of years, especially in the sections of Florida which are growing rapidly and expanding economically.

It should perhaps be noted that essentially the same process is taking place among the white population. For example, rural schools are being improved throughout county-wide school systems in Florida. The trend of the times is in the direction of providing a greater equality of opportunity and of fostering the widest and fullest development of the human resources found within each county in the state of Florida.

Suggestions for Further Study

Evidence was revealed in this study that county-wide socio-economic factors of median years of school completed by adults and county-wide annual family income are more closely associated with achievement in English and social studies than with natural science and mathematics. County-wide school systems should be studied in order to analyze the following questions:

1. What are additional reasons which may contribute to these variations?

2. Why do pupils in some of the county-wide school systems score higher in certain areas of academic achievement than in other areas?

3. Do courses of study and graduation requirements differ among the counties and are the differences influential in these variations?

A study, or studies, devoted to the purpose of finding better measures of the socio-economic level of a county or smaller area would be of much value. This research would involve the development of more valid techniques for ranking counties, school systems, and individual schools according to socio-economic status. The technique used in this study for analyzing the white and nonwhite population separately would provide useful information for solving educational and social problems. It would be valuable to have up-to-date information concerning the effects of many facets of the environment on white and minority groups.

Other studies might be undertaken to discover more about how certain elements of the socio-economic environment of a school vary in their effect upon the individuals in that school.

Finally, it should be noted that a mass of material comprising the special worksheets, data tabulations, machine processing cards, and other materials are intact and available for further research. The possibilities for further analysis of the data accumulated in this study are considerable.

Bibliography

1. Bullock, Henry Allen. "A Comparison of the Academic Achievement of White and Negro High School Graduates," Journal of Educational Research, 44: 179-192, November 1950.

2. Continuing Educational Council of Florida. Quality in Florida's Public Schools. Tallahassee, Florida: The Council, 1959. (Mimeographed.)

3. Lorimer, Frank and Osborn, Frederick. Dynamics of Population. New York: The Macmillan Company, 1934.

4. Maller, J. B. "Economic and Social Correlatives of School Progress in New York City," Teachers College Record, 34: 655-670, May 1933.

5. Morphet, Edgar L. and Others. Education and the Future of Florida. Tallahassee, Florida: Florida Citizens Committee, 1947.

6. Mort, Paul R. and Cornell, Francis G. American Schools in Transition. New York: Bureau of Publications, Teachers College, Columbia University, 1941.

7. Snedecor, George W. Statistical Methods: Applied to Experiments in Agriculture and Biology. Third edition. Ames, Iowa: Iowa State College Press, 1940.

8. Stoddard, George D. The Meaning of Intelligence. New York: The Macmillan Company, 1949.

APPENDIX A

WORKSHEETS USED IN THE DEVELOPMENT OF THE PRINCIPAL MEASURES USED IN THE STUDY

1. Income of Families and Unrelated Individuals.
2. Years of School Completed by Persons 25 Years Old and Over.
3. Frequency Distributions of Raw Scores of White and Nonwhite Florida High School Seniors in _____ County on the State-Wide Twelfth-Grade Testing Program.

YEARS OF SCHOOL COMPLETED BY PERSONS 25 YEARS

OLD AND OVER

_____COUNTY, FLORIDA

School Years Completed	White	Nonwhite	General Population
0			
1-4			
5-6			
7			
8			
9-11			
12			
13-15			
16 plus			

Median years of
school completed

INCOME OF FAMILIES AND UNRELATED INDIVIDUALS

_____ COUNTY, FLORIDA

Income Intervals	White Population
Less than $500	
$500 to $999	
$1,000 to $1,499	
$1,500 to $1,999	
$2,000 to $2,499	
$2,500 to $2,999	
$3,000 to $3,499	
$3,500 to $3,999	
$4,000 to $4,499	
$4,500 to $4,999	
$5,000 to $5,999	
$6,000 to $6,999	
$7,000 to $9,999	
$10,000 and over	
Median income (dollars)	

FREQUENCY DISTRIBUTION OF RAW SCORES: WHITE AND NONWHITE

Florida High School Seniors in _____ County on the State-Wide Twelfth-Grade Testing Program

Intervals	Psychology				English				Social Studies				Natural Science				Mathematics				All 4 Subjects			
	W	NW	COM	cf	W	NW	COM	cf	W	NW	COM	cf	W	NW	COM	cf	W	NW	COM	cf	W	NW	COM	cf
90 - 94																								
85 - 89																								
80 - 84																								
75 - 79																								
70 - 74																								
65 - 69																								
60 - 64																								
55 - 59																								
50 - 54																								
45 - 49																								
40 - 44																								
35 - 39																								
30 - 34																								
25 - 29																								
20 - 24																								
15 - 19																								
10 - 14																								
5 - 9																								
0 - 4																								
N																								
$\frac{N}{2}$																								
Median																								

BIOGRAPHICAL ITEMS

Samuel S. Bottosto was born in Massena, New York, January 21, 1916. His elementary and secondary school was in Massena, New York, and he graduated from Massena High School in June, 1933. In the fall of 1934 he attended Potsdam Normal School (now Potsdam State Teachers College) in Potsdam, New York, completing a three-year teacher training program in June, 1937. Upon the completion of his work at Potsdam, he accepted an eighth-grade teaching position at Hogansburg, New York, where he remained for four years. During the summers of 1938-1940, he attended Teachers College, Columbia University, New York City.

During World War II, the author served at first in a Special Training Unit at Camp Croft, South Carolina, and later overseas with the 45th Combat Infantry Division as a squad leader and sergeant in a 60-mm. mortar section, taking part in several European campaigns involving the forces of the United States Seventh Army.

Following the close of World War II, the author resumed his work at Teachers College, where he obtained his B. S. degree in 1946. Shortly after receiving his degree, he accepted a position to teach an eighth grade in the Greenville Junior High School, Greenville, South Carolina. During the summer of 1947, he began his graduate work toward the Master of Arts degree at Furman University in Greenville, South Carolina, and earned this degree in 1951.

In 1950, the author moved to Florida, accepting a position in Daytona Beach, Florida, teaching an eighth grade in the Mainland

Junior-Senior High School. After teaching in Daytona Beach for five years, the author was granted an official two-year leave of absence to work toward his doctorate in educational administration at the University of Florida.

The author is a member of three honorary and professional fraternities: Phi Delta Kappa, Kappa Phi Kappa, and Kappa Delta Phi.

In 1942 the author married Miss Margaret E. Wiggin. They now have two children: a son, John Randolph, born in 1946; and a daughter Rebecca Jane, born in 1952.

This dissertation was prepared under the direction of the chairman of the candidate's supervisory committee and has been approved by all members of that committee. It was submitted to the Dean of the College of Education and to the Graduate Council, and was approved as partial fulfillment of the requirements for the degree of Doctor of Education.

June, 1959

J. R. White
Dean, College of Education

Dean, Graduate School

SUPERVISORY COMMITTEE:

Chairman Jos. M. Lepo

R. B. Myers

Douglas E. Scates

J. A. Hynes

R. L. Johns

George R. Bentley